OCTOBER 1953

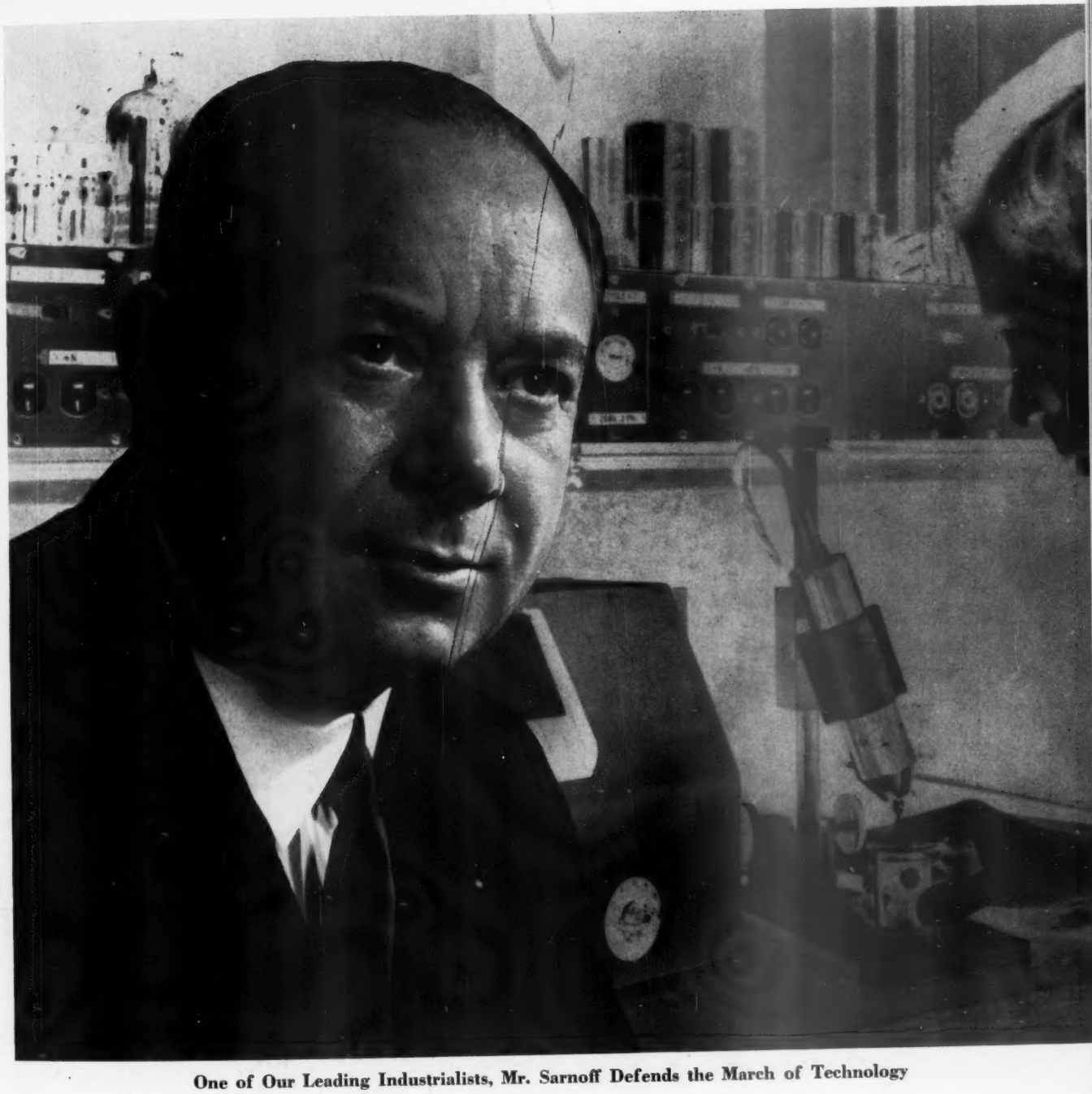
American Engineer

UNIVERSITY OF MICHIGAN
OCT 20 1953
ENGINEERING LIBRARY

IN THIS ISSUE . . .

● **THE CASE FOR TECHNOLOGY**

By Brig. Gen. David Sarnoff,
Chairman, Board of Directors, Radio Corporation of America



One of Our Leading Industrialists, Mr. Sarnoff Defends the March of Technology

. . . *Also*

The Automobile—Tribute to American Engineering —A Photo Story—

●

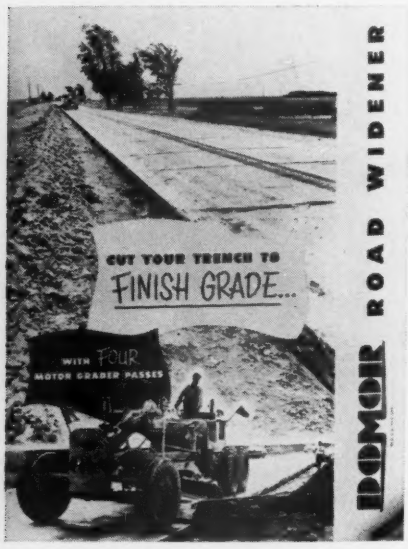
Patent Fundamentals for Engineers By Henry K. Leonard —Part I—

●

Plus News Briefs, Washington Report, Other Features

. . . NEW LITERATURE . . .

To help the offering firms determi which literature you require, when questing an item, be sure to list specifications shown . . . and say saw it in the AMERICAN ENGINEE



DOMOR ROAD WIDENER — Four-page "how to do it" folder on the DOMOR Road Widener, a quick change attachment mounted to any motor grader blade, has just been released by Ulrich Products Corporation.

Step-by-step photographs explain the proper application and use of the DOMOR Road Widener in preparing the widening trench along the edge of a surfaced road which is filled with concrete or asphalt without using forms —resulting in a wider, safer highway at low cost. For folder RW103, write Ulrich Products Corporation, Roanoke, Illinois.

—AE—

VIBRATION CONTROL BOOKLET—Vibration and noise isolation bases for fans and motors are described in the new Catalog FB-802, published by The Korfund Co., Inc.

Designed to give the maximum help to engineers, architects, contractors and fan manufacturers, the catalog gives illustrations, descriptions and specifications for the Twin Rail Base, Vibro-Var Base, Steel Spring Vibro-Isolator, and other vibration isolation equipment.

Case histories are featured; one describes how a contractor successfully controlled vibration and noise transmission from a fan and motor installed on the roof of a leading Washington, D. C. hotel. The Korfund isolators allowed the rental of the top floor of the building which had been impossible because of excessive vibration and noise. Write: Korfund Co., Inc., 48-23-R Thirty-Second Place, Long Island City 1, New York.

—AE—

MINIATURE MULTITESTER — Information on a Miniature Multitester combination volt-ohm meter for testing resistances and AC or DC voltages has been announced by International Instruments, Inc.

Small in size, designed for electronic equipment servicemen to use in the field, this tester is only 4¼" x 3" x 1½" and weighs 12 ounces. Write: International Instruments, Inc., P. O. Box 2954, New Haven 15, Conn.

CABLE CONVEYOR BROCHURE—Cable-Link Corporation recently announced the development of three cable conveyor models capable of light, medium and heavy materials handling. The maximum suspended load capacities of these systems range from 80 lbs. to 500 lbs. per station. Pull loads per drive are reported as ranging from 1500 lbs. to 4000 lbs. A brochure describing these systems can be obtained by writing the Cable-Link Corporation, 20175 John R. Street, Detroit 3, Michigan.

—AE—

NEW METAL HOSE CATALOG—Titeflex helically-wound flexible metal hose and Uniflex helically-corrugated flexible metal hose are illustrated and described in Catalogue No. 200 just published by Titeflex, Inc. Catalog contains complete descriptions and specifications for flexible metal hose, fittings and assemblies, flexible metal conduit and ferrules, Uniflex hose assemblies, ignition shielding and components for reciprocating engines, Titeflex bendable pipe and Titeflex high- and low-frequency leads.

Featured in the Engineering Data section are charts showing frictional losses versus flow rates for various sizes of metal hose and conduit, also complete information on installation and maintenance of metal hose. Shows how seamed metal hose is manufactured, from metal strip to completed assembly. Write: Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.

—AE—

NEW BOOKLET ON ELECTRODES — Air Reduction announces the availability of an up-to-date 50-page pocket guide to Airco electrodes.

Over 30 different electrodes—stainless, mild and high tensile steels, cast iron, nonferrous, low hydrogen, and hardfacing are described as to chemical analysis, procedure for welding and application.

Other sections in the booklet include "Picking the Right Electrode," mechanical properties and testing of electrodes, and AWS-ASTM specifications.

This illustrated guide (Form ADC 650) can be obtained by writing Air Reduction Sales Company, 60 East 42nd Street, New York 17, N. Y.

—AE—

VIBRO-TAMPER BULLETIN — Construction details and operational advantages of Vibro-Tampers in single-course, water bound macadam construction are described in an illustrated bulletin by the International Vibration Co.

The machine is capable of compacting a single 12-inch course to 9 inches in one pass. In addition to eliminating unkeyed planes encountered in two and three-course construction, Vibro-Tamper also eliminates backtracking of equipment, reduces labor formerly required for rolling, brooming, etc. Designed for easy field servicing, belt replacement, etc. A list of contractors and jobs where Vibro-Tamper has been employed is included. Write: International Vibration, 16702 Waterloo Road, Cleveland 10, Ohio.

STEEL FRAMING CATALOG — T Mult-A-Frame Division of Ainsworth M facturing Corporation has issued a new c log containing installation photographs, lustrations and information on various ty and sizes of channel frame and fittings, gineering data charts, and other useful m terial.

Mult-A-Frame is a new fully-locking st framing material with "1000 and One" s that provides skyscraper strength with bulk. Strong and versatile, it can be used frame, hang or support virtually anythi Completely reusable, quickly assembled disassembled. Write: Mult-A-Frame Di sion, 1471 E. Atwater Street, Detroit 7, Mi

—AE—

AUTOMATIC WELDING HEAD BU LETIN — A bulletin describing t Model 944 automatic welding head a positioner is available from Mir-O-A Alloy Company, 312 North Avenue 2 Los Angeles 31, California.

Control of both welding head a positioner operation is automatic in t 944, as well as the high frequency pi circuit, if one is used. Motor drive electrically independent of position and welder power supply. Simplifi control unit provides for complete m ual control of positioner, and weldi current control if transformer equipped for remote control. Weldi voltage and current meters are pr vided. Designed to operate with a positioner or transformer; maximu current capacity is 2,000 amps.

—AE—

NEW, VCI-LINED, CUSHIONED BAGS JET-PAK, INC., has just released a n folder describing JET-PAK's new, V Lined, cushioned bags which protect m parts from rust and corrosion up to 10 ye

VCI-Lined Cushioned Bags are co structed to serve all industries and are fi ing widespread use for the shipping a storing of machine parts, electrical and el tronic parts, precision instruments, autom tive parts and accessories, etc. Folder al help with particular packaging proble may be obtained from JET-PAK, INC., 87 879 Summer Avenue, Newark, N. J.

It's Paved with *Komac** the Year-Round patching and paving premix

Tarmac®

For Road Building or Resurfacing

TARMAC resists the stripping action of water . . . even withstands the softening effect of gasoline and oil drippings.

You can speed up construction work with TARMAC because it penetrates quickly, cuts through dust or moisture films readily, mixes easily with local aggregates and adheres firmly.

• Easy-to-apply KOMAC premix is the answer to your patching and resurfacing problems. Regardless of the weather—rain or shine, hot or cold—you just sweep out the hole and fill it with KOMAC premix. Compact it thoroughly, then open the road immediately to heavy-duty, continuous traffic.

One of the distinct advantages to remember about KOMAC is that it may be stored for a year or more without losing its easy workability. And it *pays* to stockpile KOMAC; as you know, road surfacing materials aren't always available in emergencies. But when you've got KOMAC on hand, you just shovel it into trucks and you're ready to go. It won't stick to shovels, truck beds, or spreading equipment.

Investigate KOMAC premix. Get your supply of it before the cold weather sets in, and you'll have it *when* you need it. For complete information, write today for our free booklet.

**Koppers Trademark*

KOPPERS COMPANY, INC.

Tar Products Division

Dept. 1015T, Pittsburgh 19, Pennsylvania

KOPPERS *Komac* PREMIX

DISTRICT OFFICES: Boston, Chicago, Los Angeles, New York, Pittsburgh, and Woodward, Ala.

American Engineer

OCTOBER, 1953

Kenneth E. Trombley, Editor

Mary Margaret Milbrath, Assistant to the Editor

Vincent F. Waters, P.E., Chairman, Publications Committee, NSPE

N.S.P.E. Officers

T. Carr Forrest, Jr., P. E., Pres., 803 Praetorian Building Dallas, Texas

N. W. Dougherty, P.E., V. Pres. Univ. of Tenn. Knoxville, Tenn.

Orland C. Mayer, P.E., V. Pres., Idaho Power Co. Boise, Idaho

Alfred J. Ryan, P.E., V. Pres., 1340 Glenarm Place Denver, Colo.

Edwin W. Seeger, P.E., V. Pres., 315 North 12th Street Milwaukee, Wisc.

Clarence T. Shoch, P.E., V. Pres., 901 Hamilton Street Allentown, Pa.

C. Y. Thomas, P.E., V. Pres., 610 Dwight Bldg. Kansas City, Mo.

Russell B. Allen, P. E., Treas., 4610 Hartwick Road College Park, Md.

Paul H. Robbins, P. E., Ex. Dir., 1121 15th Street, N.W. Washington 5, D C.

Admission to the hall of freedom is not free . . . the entry fee is high. The charge for remaining there is higher yet.

—Gen. Matthew B. Ridgway, Army Chief of Staff

Member, Controlled Circulation Audit

• SPECIAL ARTICLES

The Case for Technology 9
By Brig. Gen. David Sarnoff, Chairman, Board of Directors, RCA. An encouraging report by one of America's best-known industrialists.

The Automobile—Tribute to American Engineering . . . 14
—An American Engineer Photo Story—

Patent Fundamentals for Engineers 17
By Henry K. Leonard. An outstanding patent attorney gives valuable advice. Part I of III Parts.

Meet Elgin Robertson 20
What Kind of An Executive Does An Engineer Make? . . 23
By E. E. Jenks, V. Pres., Alex. Hamilton Institute
An Author and An Inventor in the News 26

• REGULAR FEATURES

Letters 5
Professional News Briefs 6
Special American Engineer Report 8
From Washington 21
Professional Postscripts 27
NSPE Believes—Professional Stature—Not Via Collective Bargaining 32
With Our Members 33
Strictly Business 41

New Literature . . . . . Inside Front Cover
Contractors Directory 16
Advertisers Index . 28 New Processes . . . 31
Professional Directory . 35, 36, 37, 38 Classified Ads . 38
What's New—New Products of Interest 42

ADVERTISING INFORMATION:
R. A. Oliver, Advertising Director
American Engineer, 1121 Fifteenth Street, Washington 5, D. C.
Telephone: ADams 4-1622

NEW YORK:
J-V Associates,
274 Madison Avenue,
New York 16, N. Y.
Telephone: ORegon 9-0030

DETROIT:
C. Frank Holstein,
2970 West Grand Boulevard,
Detroit 2, Michigan
Telephone: TRinity 5-7026

CHICAGO:
Franklin E. Wales and Son
30 N. La Salle Street
Chicago 2, Illinois
Telephone: CEntral 6-3305

LOS ANGELES:
Wentworth Green
439 South Western Avenue
Los Angeles 5, Calif.
Telephone: DUnkirk 7-8135

The American Engineer is published monthly by the National Society of Professional Engineers, 1121 15th St., N. W., Washington 5, D. C. Entered as Second Class Matter at the Post Office, Washington, D. C., under act of March 3, 1879. Copyright, 1953, by the National Society of Professional Engineers. Not responsible for opinions expressed in signed articles. Subscription Rates: $2 per year in advance to members of NSPE and its Affiliated Societies; $3 per year in advance to non-members in U. S. A. and its possessions, Canada, and Mexico. Foreign, $4 per year. Single copy, 35c.

Letters

Baruch's Article . . .

Dear Sir:

In regard to Mr. Baruch's article in the September AMERICAN ENGINEER, I cannot agree with some of his statements.

If the growth of the liberal tradition was the result of medieval barbarism, then logically the growth of the Soviet system is the result of "liberalism."

In addition, our present day barbarism far exceeds anything that occurred in the middle ages.

The cause of the present day Soviet system is sin, of which one of the cardinal ones is "intellectual, secularistic liberalism."

It was most gratifying to note that Mr. Baruch admits that we have to give up something in order to enjoy greater happiness, the goal of every man. This something is sin—it's as simple as that.

PETER W. ROGAN, P.E.,
Windsor, Conn.

A.S.M.E. Views . . .

Dear Editor:

. . . I would like to call attention to page 670 of the August issue of *Mechanical Engineering*, setting forth A.S.M.E. President F. S. Blackall's views on the functions of the A.S.M.E. As he sees it, the technical societies must stick to technical matters.

The engineer is also a citizen and must perform a citizen's duties. I am glad that the National Society of Professional Engineers provides the opportunity for him to discuss these affairs. Every engineering curriculum should include a required course covering the engineer's legal and economic relations to his country.

CARROLL D.
BILLMYER, P.E.,
Kingston,
Rhode Island

Army Personnel . . .

Dear Editor:

The article by Edward J. Sloane, of the office of civilian personnel, Department of the Army, outlines very well our national difficulty regarding the shortage of engineering talent. This article, found in our August issue, fails, however, to point up some of the salient reasons for our troubles in this respect.

We are short of valuable technical personnel because of the loss of four years of graduation of such people from our col-

(*Continued on page 39*)

IMPORTANT NOTICE

The Genuine MAUSER
VERNIER CALIPER

IS NOW MADE OF
STAINLESS STEEL
THROUGHOUT

The fine finish will not tarnish or deteriorate in many years of use.

NEW #101

$14.75 POSTPAID

... AND THE FOLLOWING IMPROVEMENTS HAVE BEEN ADDED

★ A SPECIALLY LONG VERNIER to read the thousandths
★ A HARDENED PHOSPHOR-BRONZE adjustable gib retains accuracy
★ 3 EASY READING SCALES • 1/1000" • 1/128" • 1/10 mm. in back

Request Illustrated Folder showing complete line of MAUSER Toolmakers Calipers, Height gages, Bevel Protractors and Tool Stands.

Dealers: Here's a real profitable line!

GEORGE SCHERR CO., INC.
COMPLETE LINE OF PRECISION INSTRUMENTS
200-AE LAFAYETTE ST. • N.Y. 12, N.Y.

Important PITMAN books for your reference shelf!

Plane Surveying, 2nd Ed.

By F. R. Theroux, L. A. Smith, and L. V. Nothstine. The new second edition (1953) is a concise, yet thorough coverage of surveying. Throughout the accent is on the practical side of the subject. There are whole new chapters on: The Plane Table, Hydrographic Surveying, and Photogrammetric Surveying. You will find all the topics presented in a very logical order. *407 pages, $4.75*

Strength of Materials

By G. N. Cox, F. J. Germano, and J. H. Bateman. This book emphasizes the actual, rather than the idealized behavior of materials. Completely up-to-date, it stresses the limitations and assumptions in the deviation of all formulas. There are over 500 problems! *380 pages, $5.50*

Elements of Propeller and Helicopter Aerodynamics

By D. O. Dommasch. This new summary of the latest theories on propellers and helicopters originated as a series of lecture notes for the author's course at Iowa State College. *181 pages, $4.50*

Modern Air Conditioning, Heating and Ventilation, 2nd Ed.

By W. H. Carrier, R. E. Cherne, and W. A. Grant. A new, enlarged, and completely revised edition of a standard book that applies tested theory to actual practice in industry, and includes the latest developments and concepts. There are problems, charts, diagrams, and a new two-color Carrier psychometric chart based on enthalpy. *574 pages, $10.00*

Materials of Construction

By J. H. Bateman. A thorough and accurate treatment of the production, properties, and uses of materials of construction—with a separate treatment of mineral aggregates. Stresses applications of various kinds of steel and importance of lightweight metals in the field. *568 pages, $6.50*

Principles of Aerodynamics

By D. O. Dommasch. New, practical description and definition of the physical laws basic to aerodynamics and the methods used to apply these laws to specific problems. The author presents the mathematical methods used and the steps required in the development of each equation. *389 pages, $7.50.*

Send for free 10-day examination copies!

PITMAN Publishing Corporation, 2 West 45th Street, New York 36

Professional News in Capsule Form

J. W. Beretta Named Stevens Aide • Automobile Industry Urged to Concentrate on Safety, Not Speed • Highway Transportation Research Program Inaugurated in Texas • Air Pollution Fighters Plan "Cleaner Air Week" • Other Items of Interest

J. W. Beretta, prominent San Antonio, Texas, engineer and a past president of NSPE, has been appointed a civilian aide to Secretary of the Army Robert Stevens. He is one of six civilian aides in the Fourth Army area and will act as advisor and representative for Secretary Stevens in that area.

Mr. Beretta served as a colonel with the Army Engineers during World War II and was stationed in Newfoundland and in the European theater. He is president of the engineering firm of Beretta, Greenslade, Clark & Collins and also of the First National Bank of San Antonio and the San Antonio Clearing House.

* * *

Automotive manufacturers must concentrate less on competitive speed rates and more on incorporating additional safety features in their cars in order to avoid a terrible increase in highway accidents, delegates to the fifty-first meeting of the American Automobile Association were told in Los Angeles recently. The warning came from both Rudolph F. King, Massachusetts registrar of motor vehicles, and Professor Dean A. Fales of the Massachusetts Institute of Technology.

"Already," said Mr. King, "the public is becoming alarmed at the constant advertising of speed by automobile manufacturers. With the traffic situation as it is in our country, more thought must be given by the engineers and manufacturers to safety and less to good looks and speed."

Seconding Mr. King's recommendations, Professor Fales called competition among auto manufacturers to increase engine power "a race with death" and urged that instead they concentrate on steering gear improvements and the prevention of skidding.

* * *

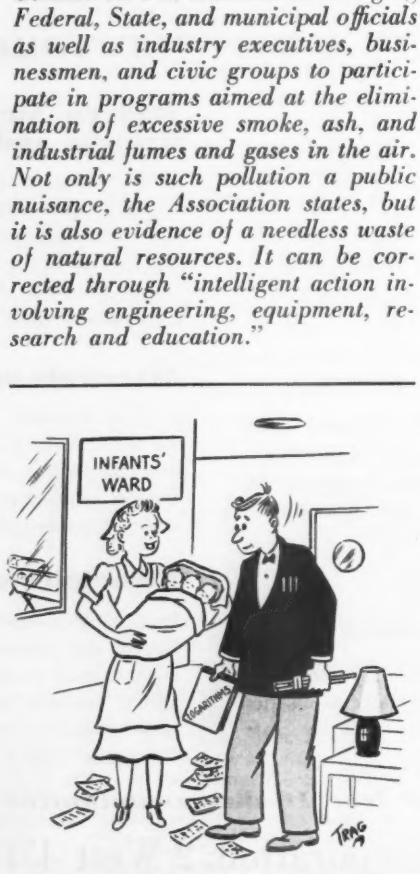
The Texas State Highway Commission and the board of directors of the Texas A and M College System have announced the establishment of a highway transportation research program for Texas. The announcement was made jointly by D. C. Greer, state highway engineer, and M. T. Harrington, chancellor of the Texas A and M College System.

Technical staffs of both the highway commission and the college will work on research problems covering all phases of highway activity, including economics, materials, specifications, design, construction, and maintenance.

Thomas H. MacDonald, recently retired as head of the U. S. Bureau of Public Roads, has accepted the position of distinguished research engineer with the A and M System to work in the program. Associated with him in the project will be Gibb Gilchrist, recently retired as chancellor of Texas A and M and a nationally recognized highway authority.

* * *

October 18 to 24 has been designated as "Cleaner Air Week," an annual observance sponsored by the Air Pollution Control Association and endorsed by the U. S. Department of Commerce. The Association is urging Federal, State, and municipal officials as well as industry executives, businessmen, and civic groups to participate in programs aimed at the elimination of excessive smoke, ash, and industrial fumes and gases in the air. Not only is such pollution a public nuisance, the Association states, but it is also evidence of a needless waste of natural resources. It can be corrected through "intelligent action involving engineering, equipment, research and education."



"Your calculations were absolutely correct!"

In a recent *Business Week* article on "Tomorrow's Management," the prediction is made that, despite the advance of technology, the top managers will have to know less about technology and more about finance, sales, and accounting in the future. There will have to be engineers and other technically-trained people, of course, but they will supply their specialized information to top management.

The report states that it may even be difficult to train top management men in big companies and that some look ahead to a time when they will be taken from the ranks of small business where individuals will continue to learn and use a variety of skills. "The professional manager, trained to tap the brains of specialists, will become a reality," the article concludes.

* * *

The British Columbia Engineering Society reports that a recent survey conducted both among its members and among engineers-in-training shows that the majority favor a four-year experience requirement to membership. It was noted, however, that a good number of those who replied in favor of the four years did so with the written reservation that, if uniform registration could be obtained on the basis of two years of experience, they would support this period.

* * *

The American Society of Mechanical Engineers will hold its fall meeting in the Sheraton Hotel, Rochester, N. Y., October 5 through 7, with the cooperation of the Rochester Engineering Society and the Engineering Institute of Canada. Among the luncheon and banquet speakers will be: Robert Winters, Canadian Minister of Resources and Development; J. Foster Petree, editor of *Engineering*, London, England; Carey H. Brown, manager of engineering and maufacturing services, Kodak Park Works, Eastman Kodak Company; and Frederick S. Blackall, Jr., ASME president.

Current information on a variety of engineering subjects will

be presented during the technical sessions.

* * *

Other meetings of interest to engineers that will be held during October include:

The ninth National Conference on Industrial Hydraulics, scheduled for Chicago's Sheraton Hotel, October 8 and 9.

An Advanced Base Water Supply and Sanitation Symposium, sponsored by the Bureau of Yards and Docks of the Navy Department, to be held October 7, 8, and 9 at the U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, California.

A two-day symposium on the problem of excessive noise, including industrial, traffic, vehicle, and other urban sources of disturbance, to be held October 23-24 at the Armour Research Foundation, Illinois Institute of Technology, Chicago, under the sponsorship of the National Noise Abatement Council and other interested organizations.

* * *

College costs are climbing this year as are college enrollments, according to a recent *Wall Street Journal* survey. It is generally agreed that the tuition rates of American colleges are at a record peak. The Case Institute of Technology, for instance, has boosted its tuition from last year's $650 to $750 for the current school year, both figures contrasting sharply with the $350 charged in 1940.

Tuition is not the only thing going up either, as all other expenses contingent upon college attendance seem to be rising also. The Massachusetts Institute of Technology figures the fixed costs of a year at M.I.T.—exclusive of travel, clothing, laundry, and recreation—at $1,872 for this year. This breaks down into: tuition—$900, board — $525, room — $330, books and materials—$95, and medical insurance—$22. The comparable total for 1940 was $1,175.

* * *

Degrees in nuclear and industrial engineering will be granted at Kansas State College, Manhattan, Kansas, following the inauguration of a new nuclear engineering curriculum at the school this fall. It will combine fundamentals of atomic energy and radiotracer techniques with basic engineering courses in mechanics, unit operations, thermodynamics, and design.

* * *

"The growth of the electrical industry in the next decade will be very great indeed," Clarence H. Linder prophesied recently on the occasion of his appointment as vice president of engineering and head of the engineering services division of the General Electric Company, Schenectady, N. Y. "I believe," the G-E executive also stated, "that the future holds incomparable advantages for those who are willing and able to face up to individual and collective challenges."

* * *

Edward F. McCrossin, a New York consulting engineer and a lieutenant colonel in the Reserve Corps, has been named chief of the New York Ordnance District, according to an announcement from the Washington office of Major General E. L. Ford, chief of the Army Ordnance Corps. The district office, which Mr. McCrossin will head, negotiates and administers contracts for the procurement of ordnance materiel in the northern New Jersey, New York City, and lower New York State area.

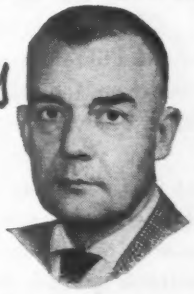
* * *

"Technology, probably more than any other factor, is primarily responsible for industry's continually increasing productivity" in the viewpoint expressed in a recent statement made by the Council for Technological Advancement following a study of factors involved in the measurement of productivity. The Council pointed out that productivity expresses not merely labor efficiency but the efficiency of all factors of production such as varying degrees of mechanization, changing levels of managerial effectiveness, and utilization of plant facilities and technical processes.

GOES PLACES IN NARROW SPACES—Revolvator Go-Getter Powered Hand Truck permits maximum use of storage or productive areas. The compact model shown above is a Hi-Straddle Lift with fingertip control—fully automatic 200° turning arc—slight operator training. Let us know your problem and we'll help you solve it. Phone or write Revolvator Co., 8782 Tonnele Avenue, North Bergen, N. J. Union 3-8120.

It's Good Business To Check American Engineer Ads for New Methods of Doing Things!

A Message to Engineers from Walter Tydon*



"A secure future, exceptional opportunities for advancement, and a high starting salary await you at FAIRCHILD, if you are one of the men we are looking for. We have openings right now for qualified engineers and designers in all phases of aircraft manufacturing; we need top-notch men to help us in our long-range military program: turning out the famous C-119 for the U. S. Air Forces.

"FAIRCHILD provides paid vacations and liberal health and life insurance coverage. We work a 5-day, 40-hour week.

"If you feel you are one of the men we are looking for, write me. Your inquiry will be held in strictest confidence, of course."

Walter Tydon

*Walter Tydon, widely known aviation engineer and aircraft designer and veteran of 25 years in aviation, is Chief Engineer of Fairchild's Aircraft Division.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD Aircraft Division
HAGERSTOWN, MARYLAND

An *American Engineer* SPECIAL REPORT

Re: *Team Research*

● A new 103-page book of interest to those engaged in directing or organizing engineering or scientific research teams has recently been published under the auspices of the Department of Industrial Engineering of Columbia University. Entitled "Team Research," the book, which was written by David Bendel Hertz and Albert H. Rubenstein, presents the results of a survey on such research sponsored by the Human Relations Branch of the Office of Naval Research with supplementary grants from The American Chemical Society, Columbia's Department of Industrial Engineering, and Industrial Laboratories.

The project was begun in 1951 for the threefold purpose of studying and evaluating: (1) the extent of use of the research team, its size and membership, in various types of research; (2) the organizational relationships and patterns of specific research groups; and (3) communication problems arising from team research activity. Numerous statistical tables, charts, and graphs testify to the thoroughness with which the subject was studied.

"We believe," say the authors, "that the communications system in a laboratory is the key to the most efficient organization," and this important topic is given pre-eminent attention in all its phases throughout the book. (NSPE has also taken a close look at the communications problem recently, and the results of its study have been published as the first Executive Research Survey Report—"How to Improve Engineering-Management Communications.")

In addition to personnel-management communications and inter-personnel communications as such, the report also deals with the wide range of "communication media" through which personal communications are exchanged, or which serve as a source of information essential or at least helpful to the fulfillment of the research task. The "media" dealt with range from such mechanical tools as the telephone to such outside sources of information as the meetings of professional societies, advanced academic work, and tours of other industrial plants and laboratories.

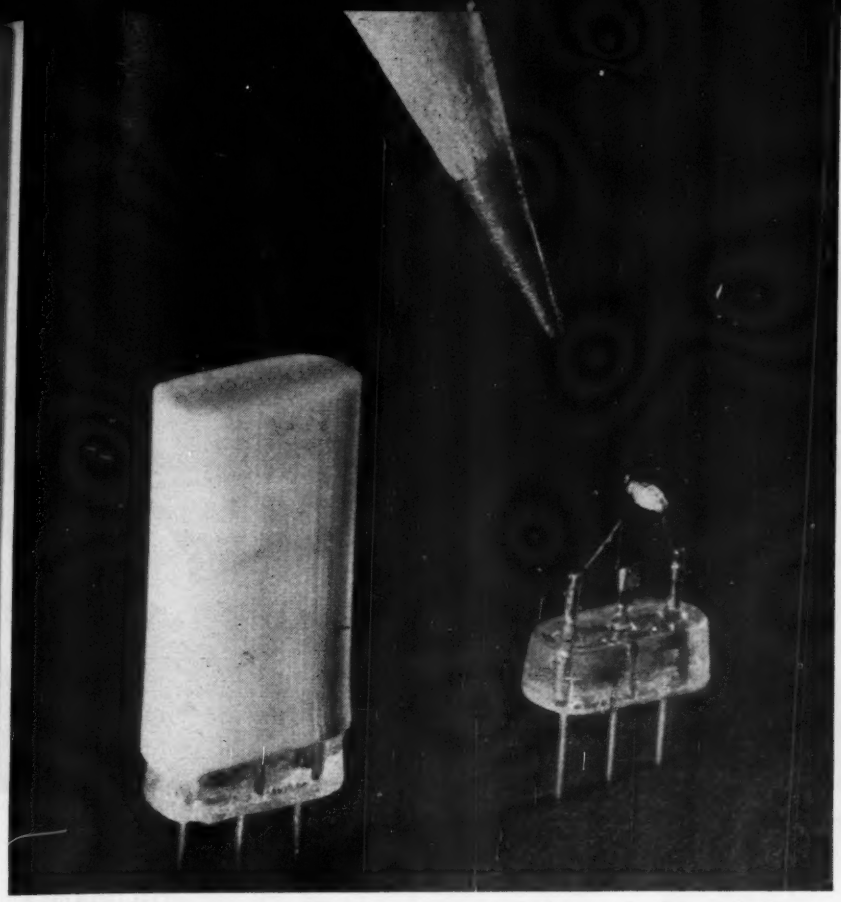
In commenting on the physical and equipment facilities necessary for the most effective research work, the authors point out that a trend toward "equipment-mindedness" has been accelerated today among many scientists and engineers, largely because of the appearance of so many specialized instruments and research tools. They note that, "a number of laboratory administrators have remarked on the tendency to ignore preliminary planning and experimental design at the desk in favor of rushing to the bench to run experiments and get data." They state further that: "The temptation to 'try out' an idea instead of 'thinking it out' is responsible for many false starts and much wasted time in the nation's research laboratories." However, they also point out that there is no real way in which such waste can be validly measured in terms of availability or non-availability of equipment.

Considerable information is also given in the report on the make-up of industrial research groups and the utilization of the scientific skills represented among the researchers. Data in this area was obtained from the replies to a questionnaire sent to 3,300 industrial research laboratories and also from some 6,871 card reports from individual research groups under the direction of the laboratories.

One significant fact reported by the authors is that, while much has been made recently of the fact that American industrial research is a team operation with members of various disciplines working together in the same group, the survey data indicates that such is not the case for the majority of research groups studied. Thus, of the 6,871 groups reported, 4,096 (or 59.4 per cent) were single discipline groups; that is, composed entirely of one profession.

Attention is nevertheless given to the research groups in which two or more professional disciplines are represented, and the observation is made that on the whole "it would seem that American industry has taken little advantage of the possibility of increasing research efficiency by teaming up various branches of engineering." It is predicted, however, that the multi-disciplinary team will be more generally used in the future. "Engineers, more than any other group," the report states, "will be utilized in the larger combination organizations. In a sense, they may be said to lend end-item direction to research groups."

Finally the authors report on the results of an on-the-spot field survey of nine specific research groups: two chemical groups in a commercial chemical laboratory, two electro-mechanical groups in the engineering department of an engineering design firm, one electrical engineering group in the research division of a large communication company, two chemical laboratory groups in the research division of a chemical manufacturing company, and two chemical groups in the research laboratory of a large printing ink company. Organizational characteristics, communication practices, information sources, and specific problems reported by the personnel concerned are among the primary items discussed in the review of this pilot study.



Every day brings progress. This tiny transistor before and after embedment in plastic container, is shown in comparison with a pencil point.

This is a special report on what the author calls the "glory of science." Here is a factual answer to those who believe that the path of technology could lead to ruin. Written by a man who knows, you'll enjoy this defense of the past and glimpse into the future.

THE CASE FOR TECHNOLOGY

By BRIG. GEN. DAVID SARNOFF, Chairman,
Board of Directors, Radio Corporation of America

TODAY the world is at both a peak of achievement and a beginning. The rapid advance of technology has given us a new era of comfort, convenience, knowledge, and power. At the same time, science has laid open a vast, untried field in which the scientist and engineer may pioneer to develop practical applications of newly-discovered scientific principles that will benefit all mankind.

In fact, without science and engineering there would be few frontiers left today. But it is the existence of these frontiers—these limitless areas awaiting technological exploration—that makes living in an engineering age a wonderful adventure.

We have come a long way in a very short while. We are reminded, for instance, that science as a dominant feature in determining the beliefs of educated men has existed for only about 300 years, and as a source of economic technique for about 150 years. These years unquestionably have been good ones—the best, I believe, that humanity has known to date, and the future promises to be even more bountiful as the continued advance of technology creates new miracles for all of us.

It is the special glory of science that the more it accomplishes, the more remains to be accomplished. Every invention or discovery, far from narrowing the perspective, opens exciting new horizons of exploration. Science, of which engineering is a part, is never fixed and finished. Though rooted in the past and the present, its thinking and its mood are inevitably geared to the future.

Yet there are persons today who categorically deny that scientific and engineering progress is a good thing. Because modern technology is behind such instruments of destruction as the H-bomb, as well as such instruments for entertainment and education as radio and television, we hear doubts expressed as to its real value. We listen to sighs about the "good old days" when civilization was less scientifically dominated and men—it is said—were less afraid. We are told that, in our race toward scientific preeminence, we have outpaced our moral and spiritual development and are now moving only toward our doom.

I for one do not believe this to be true. Admittedly, there are risks in the game. There are people in the world who would use the products of science to enslave and mislead and destroy their fellow men. Certainly, when the word *peace* is on every man's lips and yet the reality is so difficult to attain, we must work very hard and advance scientifically in order to preserve and protect our fundamental ideals. But since the true mission of science is to create and not to destroy, the case for technology, it seems to me, is very good, indeed.

FIRST of all, in a free, democratic society such as ours we have the perfect climate in which technology and ideals can go hand in hand. The essence of science is the search for truth about the natural laws which govern life, and it is nurtured best in an atmosphere of freedom.

True, particular scientific advances, special technological accomplishments, are and have been achieved in countries where true freedom of research—the right to investigate

The David Sarnoff Research Center of RCA, Princeton, New Jersey.

and explore the universe without fear of social or political reprisals—does not exist. But the most magnificent flowering of scientific progress has always taken place in countries where liberty has prevailed, especially in the United States. And surely it is only in democratic areas where we find technology directed in large measure toward the material comfort, enjoyment, and advancement of the citizens.

Thus, the engineers, who translate the principles discovered through fundamental research into the instrumentalities through which our lives are protected and enriched, have a particularly heavy responsibility. First of all this responsibility lies in the realm of technology itself, since our technological know-how must be employed to keep America strong enough to resist aggression. Yet we must not paralyze our capacity for greater good by brooding upon the capacity of science for developing weapons for war and destruction. The fact that science has sometimes been diverted to the purposes of war is not a reflection on science but on man. I do not know a single scientist, inventor, or engineer who would not rather apply his talents to the purposes of peace.

These purposes of peace then also represent a responsibility in the technological field—the resolute direction of effort to create new products and services, cultivate prosperity, and thus improve and maintain the economic health of the nation. In fact it might well be said that technological pioneering and scientific research are the insurance agents of a country's industrial progress, providing a permanent endowment of versatility and vitality.

ABOVE and beyond these purely technical responsibilities, however, the engineer has an even more important one—more important because his acceptance of it will color whatever job he does either directly or indirectly. Because his work can change living habits, expand knowledge, speed commerce, strengthen national security, disseminate education, and improve standards of living, he ought to approach it almost in a spirit of mission. His function as a monitor of the incalculable forces of technology places upon him the obligation of mature citizenship. It is up to him in no small way to see that our social thinking and our social progress keep pace with the advance of physical science. It is up to him to accept intelligently the spiritual challenges that spring from our scientific opportunities, to work as hard in the arts of cooperation, good will, and peace as he possibly can, and thus to do his part in the presently-raging "battle for men's minds."

Actually, in this so-called battle, because of our preeminence in scientific progress, we also have very potent weapons for peace. In the spiritual crusade for a free and peaceful world, science is our strongest ally. Science can help greatly to deter the aggressor from attacking the nations he seeks to conquer or destroy. It may even prevent another world war. Or, if the conflict cannot be averted, science can thwart the enemy's designs and help us immeasurably to win it. Today the research laboratory is a vital part of our national security and progress.

Also, in considering "weapons for peace," I should like to point out that there are two factors that play major roles in shaping any man's beliefs. First, there are precepts developed by spiritual and educational leaders. Second, there are means by which these precepts are communicated to men and women everywhere. Thus we can see that if we are to have real peace, we must bring all men closer to each other mentally and spiritually, just as we have already, through scientific progress, brought nations closer to each other physically.

Many centuries ago Aristotle said that a democratic government required that citizens keep in touch with one another, that leaders know each other, and that they study at first hand their problems and the policies necessary to meet them. Today, it seems to me, we can apply that advice to the requirements of a free and democratic world. And in radio and television, for example, we have two such vital links, two lines of communication, that, properly employed, can certainly help us to create an informed world opinion and achieve that international understanding that is essential to peace.

We have scarcely begun to tap the potentialities of these two media for good, and their further technological refinement will make them still more valuable. Within the

Dr. Jan A. Rajchman, RCA physicist, examines the 10,000 tiny magnetic cores, woven on a wire mesh, that "memorize" in a few millionths of a second the kind of information used in electronic computers. The magnetic memory was developed at the David Sarnoff Research Center of RCA, Princeton, N. J., to provide a high-speed and large-capacity memory to help solve problems too vast and too complex for present-day computers.

next five years we may well expect to see television established on an international basis, and nobody needs to be told what a powerful aid this will be socially, educationally, and politically, since the greatest collections of truths miss their target unless they are seen or heard.

ECONOMIC well-being, to which I have already alluded briefly, is another "weapon," a by-product of technology that is a substantial force for peace, strength, and security. And here again, we are just beginning to realize the vast potentialities that the practical application of scientific principles can bring to people around the world.

Taking a look into the future in just one field—that of electronics—we can promise such new products and services to mankind that there can be no doubt of man's unmatched opportunities to use these new tools of science for raising the standards of life everywhere.

We can expect, for instance, to see electronics revolutionize the home with countless new household products and appliances, such as noiseless electronic air-conditioners from which motors, blowers, and compressors will be eliminated. Closed-circuit television devices attached to regular sets will make it possible for the busy housewife, with the flick of a switch, to check on her children asleep in the nursery, at play in the yard, or working in their basement hobby room. And the day will come when she will not only hear the visitor ring her doorbell but also see him on a television screen before she opens the door.

Business—particularly in its larger organizations—can also expect a revolution attributable to the advance of electronics. Already electronic computors are coming into their own, and yet we have seen only the beginning of their possibilities and effectiveness. Because of them, the clerical operations performed for insurance companies, banks, tax bureaus, stock exchanges, department stores, and countless other businesses are being, or will soon be, simplified and at the same time stepped up. And personnel are being relieved of routine and drudgery so that their efforts may be turned into more interesting and satisfying channels.

Methods of rapidly double-checking the results of electronic computer operations are being developed with such

Operating off a small low-voltage battery, this transformerless and tubeless audio amplifier can provide sufficient amplification to operate a loudspeaker.

The RCA experimental tri-color television camera tube, which may in the future be able to do the job of the three camera tubes now needed in color television camera units, is held by Dr. Paul K. Weimer, head of the team developing the tube at the David Sarnoff Research Center of RCA, Princeton, N. J.

Dr. V. K. Zworykin, Vice President and Technical Consultant of RCA Laboratories Division, demonstrates the operation of the RCA television microscope to a group of high school science students.

Here is a typical scene showing an RCA-NBC color television studio "in action."

success that even one error in many billions of transactions should be a rarity. Further, an electronic system keyed to the needs of a particular business will be able to select from an enormous mass of data the information that is pertinent to the solution of a particular problem, provide it within a few minutes, and go on from there to other analytical computations.

ELECTRONICS will also contribute immeasurably to the health, safety, and life expectancy of mankind. There are unlimited applications for the development of inspection methods to insure the highest purity in liquids, vaccines, drugs, and in all bottled beverages, including milk, and packaged and canned foods.

And countless new electronic safety devices may be expected to appear on the market to make both industrial establishments and homes more accident-proof.

Even now the electron microscope is performing vital services in the field of health, revealing hitherto unseen worlds of the infinitesimal so that viruses and bacteria come into view. Human cells, blood corpuscles, tissues, and nerve fibers, magnified up to 350,000 diameters, can be photographed and more thoroughly studied than ever before in medical history. Television has also become a working partner with this microscope, making possible the highly-magnified study, through the use of a small TV camera built around RCA's sensitive vidicon tube, of living microbes that formerly were destroyed either by the intense heat of the light microscopes employed or by the dyes used to make them visible for even a brief look.

The viscometer, too, a new device which will be exceedingly useful in countless fields where a quick, accurate measure of viscosity is needed, may also be employed to chart blood-clotting rates.

Electronics of solids, exemplified by the transistor already is demonstrating the tremendous significance of this new field in relation to the future. Comprising a small particle of the metal germanium imbedded in a plastic shell about the size of a kernel of corn, the transistor is of particular importance wherever electronic apparatus is used, for this mighty mite of electronics detects, amplifies, oscillates and generates electric currents as do electron tubes. Further, the transistor has no heated filament, requires no warm-up period, and uses very little power. It is rugged, shock-resistant and unaffected by dampness. These qualities, together with its small size, offer great opportunities for the miniaturization, simplification and refinement of many types of electronic equipment, including radio and television apparatus.

New benefits continually will accrue from the expanding scope of electronics.

Among the new and most fascinating electronic advances in communications is color television, made possible by development of the compatible all-electronic system and the tri-color tube, both of which have been developed by RCA scientists and engineers.

Color promises to intensify interest in television broadcasting, as well as to extend the scope of its industrial use. Color adds realism, intensifies dramatic effects, and gives great impetus to the sales and merchandising power of television. In general, color increases television's vitality and puts it in tune with all the colors of Nature and the arts.

In the past several years, we have heard of a number of extraordinary closed-circuit demonstrations of what we call "surgical television," in which cameras and microphones suspended over operating tables have enabled large groups of nurses, doctors, internes, and students to observe operations in close-up. This effective new medium abetted by color may well prove to be the medical lecture hall of the future. It can mean that students in smaller or less centrally-located medical colleges will share advantages of instruction in unusual cases with their fellow students in large metropolitan universities associated with world-renowned hospitals.

Phases of education, other than medicine, will also benefit from the expanded use of television. We read every day of new requests to the Federal Communications Commission for the establishment of television stations and networks devoted exclusively to purposes of education. As the New York State Board of Regents has put it, an educational TV network can provide a means "to reach and make more uniform the standards of education in the State by extending to all scattered rural communities in it the educational and cultural benefits now available only in the most populous metropolitan areas."

THE opportunities for expansion of television usage in the industrial field are also unbelievably extensive, and the major obstacle of cost is gradually being overcome by the development of light-weight miniature TV equipment using the vidicon camera tube. Thus, whenever danger, remoteness, or discomfort rule out the presence of a human observer in certain operations, the industrial TV camera can take his place. Observing the setting off of high-powered explosives or the pouring of castings, watching the operations of furnaces, and checking on remote power sub-stations are only a few of the ways in which the industrial television camera may be effectively employed.

And tomorrow, and the day after tomorrow, as our engineers and scientists carry their work purposefully forward, we will be able to introduce even more astounding developments.

In 1956, I will celebrate my fiftieth anniversary in the field of radio that began with my employment as an office boy for the Marconi Wireless Company of America which later, in 1919, became the RCA. For that occasion I have asked for three "anniversary" presents from the RCA Laboratories—an inexpensive television tape recorder, an all-electronic air-conditioner, and a true amplifier of light. I have already seen experimental demonstrations of the first, which will mean a new technique revolutionary not only for TV, but also perhaps for the motion-picture industry. The air-conditioner is on the way, too; and, while the third problem is the most difficult, I firmly believe it, too, will be solved.

So, as I wrote in the introduction to this article, we are indeed at a beginning. We are merely at the threshold of technological achievements. The big things in life are cultivated and advanced by faith, vision, courage, and hard work, and these are the qualities with which we must approach both our day-by-day jobs and our professional and citizenship responsibilities.

True, these are strange and troubled times. Yet, despite H-bombs and other instruments of scientific warfare, essentially the possibilities of science offer man the opportunity to seek a finer destiny. What he needs most is the faith in spiritual guidance that will lead him to apply his new knowledge and techniques to peaceful pursuits. If we, as engineers and scientists, meet the challenge and fulfill our obligations, the continued advance of technology will undoubtedly be of the utmost benefit to mankind.

The answer to the question, "Will the scientific machines make this a better world in which to live?" lies not with the machines and with technology as such, but with each one of us as responsible individuals.—***End.***

Progress is essentially a job for science and engineering. Throughout our history the rising standards of living in America have come primarily from our development of machines and machine techniques which have greatly extended the producing capacity of the individual and in that way vastly increased the wealth of the average individual. It has been an increase in the energy made available through machines and man's skill in using the machines.

—Henry Ford, II

About the Author . . .

Brigadier General David Sarnoff, a native of Russia, was brought to the United States as a boy of nine in 1900. He was educated in the New York public schools, and later he took a special electrical engineering course at Pratt Institute, Brooklyn.

In 1906 he began his long and brilliant RCA career, starting out as an office boy with the former Marconi Wireless Telegraph Company of America, as he recounts in his article. His exploits as a young radio operator, especially in connection with the *S. S. Titanic* disaster, are among the classics of radio history; and the record of his advance through the ranks of RCA to top administrative responsibility represents a phenomenal success story.

He is a member of many professional, civic, and cultural organizations, has received numerous honorary degrees, and has been honored by many foreign governments as well as by that of the United States.

The RCA Electron Microscope is shown here with its inventors, Dr. V. K. Zworykin, Vice President and Technical Consultant of RCA Laboratories Division and Dr. James Hillier of the Laboratories staff. The electron microscope is capable of magnification up to 200,000 diameters.

• *An American Engineer Photo Story* •

The Automobile–Tribute to American Engineering

IF there is one thing, more than any other, which typifies the American engineer in the eyes of the world, it is the automobile. The design and mass production of automobiles is commonplace in America, but the gigantic scale upon which this is done is regarded (rightly enough) as a technological miracle in many other nations.

Readers of the AMERICAN ENGINEER might be interested in making a pictorial tour of the largest collections of antique automobiles in the world, at the Henry Ford Museum in Detroit. The collection is composed of automotive bluebloods—cars which marked an engineering advance in the evolution of the automobile. Many of the cars in the collection belonged to kings, Presidents of the United States, first ladies and other celebrities.

If you've always thought of the automobile as a recent, or comparatively recent invention, you might be surprised to learn that the oldest car in the collection, a steam-powered runabout, was made in 1863 when Abe Lincoln was in the White House.

One of the most famous cars in the collection is the famous "Sunshine Special," a limousine which belonged to Presidents Franklin D. Roosevelt and Harry S. Truman. The Special was retired a couple of years back after 11 years of service carrying the most important people in the world, including, among others, the king of England, Prime Minister Churchill, and the presidents of many European countries. It accompanied FDR and Mr. Truman to Yalta, Casablanca, Teheran, Malta and South America.

Weighing 9,300 pounds, the Sunshine Special is probably the heaviest luxury car ever built. Heavy armor plate, inch-thick bulletproof glass windows and self-sealing inner tubes made it formidable, indeed.

Inside the Special, there are secret handholds for Secret Service agents and a hidden compartment for a submachine gun and other weapons designed to protect Presidents Roosevelt and Truman from attack. The Sunshine Special has a super-powerful, 12 cylinder engine, but most of its 55,000 miles were accumulated at parade pace.

The Special is not the only car associated with The White House. One of the prizes of the Henry Ford Museum's collection is a Baker Victoria phaeton, vintage of 1912. This little gem is an electric auto, purchased during the administration of William Howard Taft for the use of the White House. It was the favorite auto of Mrs. Woodrow Wilson and was also used by Mrs. Warren Harding and Mrs. Calvin Coolidge. The Presidential Seal adorns its side.

The electric car will remind old timers that it was literally a long time before America's horseless carriage decided on gasoline for its fuel. Many of the early cars, like the famous Austin Steamer made in 1863 and the Stan- Steamer, seem pretty "weird" to 20th century eyes. T Austin Steamer, for example, has two cylinders direct connected to a cranked rear axle. The odd-looking "critte was capable of a speed of more than 30 miles per hour— real hot rod in those days. But it had one eccentricity— no brakes. If you wanted to stop it, you shut off t steam valve. Obviously, one had to be a good judge distance in those faraway days. Other famous steam- shown in the museum are Lane and White models.

The electric car seemed a type which might becom America's favorite for it was clean and noiseless, and ma a battery-powered car is in the collection. Another int esting model is a 1917 two-passenger coupe manufactur by the Woods Motor Company which combines both ga line and electricity as a source of fuel.

The Detroit museum has 165 famous cars and truck At the beginning of the gasoline car section is a worki model, one-fifth actual size, of the first practical tw passenger gasoline automobile ever built—by Mannheim Karl Benz. The illustrious German inventor built h epochal machine in 1885.

OTHER historic autos include the first, second and thi Fords. The first was built by Mr. Ford in 1896. It had top speed of 20 miles per hour, but was without a rever gear. The second was made in 1898 and the third in 190

A venerable old Packard known affectionately as "O Pacific" was one of the first automobiles to make a tran continental crossing, leaving San Francisco on June 2 1903, and arriving in great triumph in New York City mere two months later—on August 21.

A 1908 Buick in the collection demonstrates how cu tomers were divided into social strata. Customarily it wa sold without a top, and you had to pay an extra $100 t get a roof over your head.

A horde of foreign cars is in the museum. Such not able names as the Italian Lancia limousine, the DeDio V-8, made in Paris in 1911, a great many Rolls Royce the Belgian Minerva, and an incredible German Minerva

This Minerva is powered by the first Maybach Zeppelin engine and attained speeds in excess of 120 miles per hour Forty years ago that was fast indeed. The car's interior i finished with mahogany and inlaid rosewood. Carve ivory handles and gold fittings give it a definitely aristocratic look. In the rear seat are ornate lamps and a speaking tube for easy communication with the driver.

Almost all of the cars in the Henry Ford Museum ar in operating condition and each has been painstakingly restored to its original state.—***End.***

Over the Years...

The photos on the opposite page show models from the Henry Ford Museum. Clockwise from upper left: The 190 Buick which came sans top; Next, the first Ford production model built in 1903; The record breaker—famous old "999" which Henry Ford drove 91.4 m.p.h. in 1904; One man and two ladies in a Stanley Steamer; The first Ford, built in 1896, which had no reverse gear; The Sunshine Special, left, which carried many Presidents to famous places, and was replaced by the Lincoln on the right; A 1903 Packard that took two months to cross the country that year.

999

CONTRACTORS DIRECTORY

MR. CONTRACTOR

Engineers are your prospects. Reach them through this Directory rates are moderate . . .

1 time	6 times	12 times
$11.00	$10.50 ea.	$10.00 ea.

Simply clip your card to this list and mail to

AMERICAN ENGINEER
1121 Fifteenth, N.W.
Washington 5, D. C.

THE CARTER-WATERS CORPORATION

Materials of Construction

2440 Pennway, Kansas City 8, Missouri

THOMAS GAS CONTRACTORS, INC.

L. P. Gas & Ammonia Plants

Arthur E. Wastie, P.E., Vice President

111 Quimby Street Westfield, N. J.

"Electrical Installations of Character"

EDWARD J. WHITE COMPANY

Industrial Electrical Contractors

351 Broadway Newark 4, N. J.
Humboldt 2-6666 - 6667

E. J. WILL & CO.

General Contractors

Box 5005 T. V. Station
Columbus 12, Ohio

AGC Says Construction Industry to Set New High in 1953

The construction industry is expected to set a new record in 1953 for the eighth consecutive year, H. E. Foreman, managing director of The Associated General Contractors of America, reported recently at a meeting of the association's governing and advisory boards in Chicago's Edgewater Beach Hotel.

According to the latest estimates, the volume of new construction put in place this year will approach $35 billion, he said, adding that with maintenance and repair work included the total volume of construction performed will be about $45 billion. Last year new construction of $32.3 billion and maintenance and repair work of $10 billion added up to a total volume of $42.3 billion.

"Foreseeable demands for new construction and economic indicators point to a continued high level of construction activity in the future," Mr. Foreman declared in his mid-year report to the boards.

He said the industry is undergoing a period of readjustment in which efficient contractors who can adapt themselves to the new conditions will survive the intense competition that characterizes the market now.

Mr. Foreman said competition was intensifying despite the record volume of work available because of the tremendous increase in the capacity of the industry. He termed this "a fact of importance to the nation" since it meant a buyers' market for construction.

"The large volume of work has strained the sources of funds for new construction," the A.G.C. managing director stated. "A trend toward higher interest rates apparently has had its greatest effect on residential construction, which however, continues at a high level."

Economy moves by the federal government will curtail federal public works and defense projects but there will still be a substantial volume, he said.

NSPE Readies Two Vital Reports for Publication

The Third Executive Research Survey report, "How to Attract and Hold Engineers," and the Annual Report to the membership covering the administrative year, 1952-53, are two booklets that will soon be available to NSPE members as well as the public.

The report on "How to Attract and Hold Engineers," will be based upon information gathered from industry. The booklet will relate the experiences of leading firms and will offer suggestions as to how users of engineering services can best obtain top engineering talent and retain it.

The Survey is the third in a series begun in 1951 by NSPE's Professional Engineers Conference Board for Industry. The reports, which study problems of the engineering profession in its relations with industry, are the major activity of the Society's public relations program.

Almost ready for the printer, too, is the Annual Report to the membership. This worthwhile publication is distributed every fall to all members of the Society without charge. It covers all phases of the Society's operations during an administrative year. Members are urged to read the report carefully and then to pass it along to a non-member of NSPE.

Welding Connectors

Saxe Welding Connection Units position and secure structural parts to be welded.

Clip K3A permits an adjustable connection.

These widely used units eliminate all hole punching, and, with welding, produce the most economical, safe, and quickly erected structural frame.

Write for 1951 edition, Structural Welding Practice Manual.

J. H. WILLIAMS & CO.
Buffalo 7, New York

AIR REDUCTION CANADA, LTD.
Montreal 2, Canada

KENNEDY-RIEGGER DRILLING CO., Inc.

Diamond Drill & Core Borings

TEST BORINGS

5418 Post Road New York City
Telephone KI 9-8458

AEROFIN
CORPORATION
Syracuse New York

PATENT FUNDAMENTALS FOR ENGINEERS

BY HENRY K. LEONARD, *Patent Attorney,*
Law Offices, Owen and Owen, Toledo, O.

—Part I of III Parts—

I'D LIKE to sketch for you briefly what patents are; in general, how they work, and then try to apply what they are and how they work, to what a patent lawyer thinks engineers ought to do with patents. Now of course, we think that you ought to get as many as you can because that earns our living for us. But there are some other things that you ought to do with them, too.

Patents are based on the Constitution. The Constitution has this section in it, Article I, Section 8, which reads as follows: "Congress shall have the power to promote the progress of science and the useful arts by securing for limited times to authors and inventors, the exclusive right to their respective writings and discoveries." These words are the basis of the whole system, and almost every one of them is extremely important in the system. The right, the nature of the right, is set forth in the Constitution as an exclusive right. Those words are open to misinterpretation, but if you analyze them carefully, the word "exclusive" means that the person with the patent may exclude others. An exclusive right, in the general sense, frequently means the right to do something, but in the patent sense it has no such meaning. Merely obtaining a patent gives you no positive right, only a right to exclude others from making, using or selling the thing that is patented. Now that's not so strange because most property rights are in a sense exclusive. You own a house, and your right is really an exclusive right. Your mere ownership of the house doesn't give you any right to use it, because you may violate the law in using it, and if you do, you have no right to do so. But it does give you a right, an unquestionable right, to prevent others from using the house. And your ownership of your automobile is something like that. You may own an automobile, but as you all know, you can't drive it unless you have a driver's license, and unless you have an automobile license. But without either of those licenses you can prevent others from driving your car. So the exclusive right in property isn't so unusual.

American industry is constantly in need of new ways of doing things. Here a U. S. Steel engineer continues the search for adequate substitute protective coatings for tubular steel products.

An exclusive right isn't a monopoly either. Patents have been criticized many times as being monopolies, but they're not. A monopoly is a right to do something, the sole right to do something, rather than the exclusive right. You will recall in your study of history that years ago in England the king used to grant monopolies on the importation, say, of salt, or he might grant a monopoly on the fabrication of shoes, or he might give some favorite friend of his a monopoly for the production of swords, or breastplates or helmets. Well, those were true monopolies, because those were to that party the right to do something and the right to be the only one who could do it. But patents are not monopolies; they are exclusive rights.

The reason why they are exclusive rights and why they are given is set forth in the Constitutional language. The purpose is to promote the progress of science and the useful arts. The theory that is back of that is relatively simple. When an engineer has invented something, the public at large doesn't gain anything from his invention unless he tells them about it. The reward which he is given for telling about his invention is the patent, and his reward consists in the right of preventing others from practicing his invention for a limited period of seventeen years from the time the patent is granted. So the patent is the reward for a disclosure of an improvement in the sciences or the useful arts.

Of course if you make an invention, or an earthshaking discovery, you don't have to disclose it, you can keep it secret. And if you do keep it secret, you can't get a patent. And there is another problem involved. If, for example, you practice your process invention in secret and someone independently invents it, without knowing of your invention of it, he may secure a patent, and you may find yourself in the position of being an infringer of his patent. The law says that it must be disclosed. When you practice it in secret, you haven't complied with the law, haven't done the thing which gains you the reward, and you have acquired no patent rights.

Under the Constitutional provision, Congress has passed a number of patent statutes. The latest one was put into effect the first of this year. The fundamental basis of the statute is language reading something like this: any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter and who complies with a number of other technical provisions may obtain a patent.

These words also are important. Any person—that means that a human being is the only one who can obtain a patent in the United States. It may be one, two, three or more human beings working together, but a human being

Invention is the key to progress. Above: The girl holds electronic brains under development in North American Aviation's Electromechanical Engineering Department at Downey, Calif., which have just undergone cold tests.

only can obtain a patent. He may assign his patent, he may license it, he may give rights in it, like property rights are given in other property, but he and he alone can get it. That distinguishes from many foreign countries where a patent may be obtained by a company, and where the inventor has no connection with the patent at all. His name doesn't even appear on it. But in this country—any *person*.

HE has to do one of two things; he has to invent or discover. Here is perhaps the most difficult part of the law. "Invention" is a word which has never been successfully defined. The Supreme Court, and many of our Circuit and District Courts, have wasted hours in page after page of discussion trying to define the word "invention." Every patent lawyer could possibly give you a slightly different definition of the word "invention." I'll try to give some ideas of what it means as we go along. I'm not going to try to positively define it because I don't think it can be defined. But anyhow, he has to invent, or discover, which is not a different thing, but merely a second word to describe what he is doing.

What does he have to invent or discover? "Any new and useful" thing. "New." Of course, if it isn't new he hasn't added to the sum of human knowledge; he hasn't done the thing he is required to do—promote the progress of science and the useful arts. So it must be new. The patent law has a number of tests for novelty; some of them are set forth in the law, some of them are purely arbitrary, because you have to draw lines somewhere. But some of them are fundamental. Novelty is the first requirement.

Secondly, it must be "useful." In patent law, the word "utility" or "usefulness" is a usefulness of purpose, rather than a usefulness of means. By that I mean this: that if the purpose of the invention doesn't have utility in the eyes of the law it cannot be patented. For example, burglar tools are of great utility to a burglar, but they have no utility in the eyes of the law; so you can't patent burglar tools. For another similar example, the Patent Offie used to say that there were two major classifications of inventions on which patents simply would not be granted, in addition to the illegal ones; and these two were perpetual motion and the flying machine. So they turned away flying machine patents for years and years and years. There was no utility of purpose. It was something which was impossible to do. Of course we know that the Wright brothers proved differently and maybe one of the readers of the AMERICAN ENGINEER or some other engineering genius will prove that the law of the conservation of energy doesn't apply any more and that a perpetual motion machine is possible and, if so, he will be able to get a patent on it. But at present if you file an application on a device which upon examination turns out to be a perpetual motion machine, the Patent Office writes you a very polite letter, sends back all your papers, and even sends back your $30.00 filing fee, which is most unusual, and tells you that you can't possibly get a patent on a perpetual motion machine.

What kind of things can you patent if you have invented them and if they are new and useful? The law says you may secure patents on arts, machines, manufactures, compositions of matter. These are what the patent lawyer calls "utility patents" or you may have heard them referred to as mechanical and process patents. "Art" is a patent attorney's term for a process. A process, of course, may cover the fabrication of, say, a new resin or a chemical process which produces a new chemical or it may be a mechanical process. A process generally is a series of manipulative steps and in that sense a process patent covers what could be done by hand. Indeed, if it covers and describes only what a machine will do, it cannot be a process patent. It may be something which might be performed by machine, but must be capable of performance by at least various machines. A manufacture is an article or a thing: an individual thing—a glass, or a paper clip, or perhaps a pair of scissors, although a pair of scissors borders on the next classification—a machine, because a machine is an assembly of working parts which cooperate with each other to produce a result. If you consider a scissors, you have two working parts which are pivoted on a pin and they do so operate to produce a result; so maybe it's a machine. A machine, of course, is obvious: an automobile, or a drill press, or any other number of things which have these moving parts which cooperate. The last type of utility patent is a composition of matter. I mentioned a process for a new synthetic resin. The process of making this synthetic resin is an art. The synthetic resin itself—or the pharmaceutical itself—is a composition of matter, and the patent which covers it will set forth the description of that composition of matter, as contrasted to the description of the process patent which will set forth the steps by which the composition of matter has been made.

ADDITIONAL laws which have been passed to cover special conditions include, first, an appearance design patent, called a design patent. But they don't mean design as, for example, what most engineers consider engineering design. They mean what our industrial designing friends call appearance design; that is, what it looks like on the outside. As an illustration, we might consider Patent No. D-159,016. This is a design patent. It covers only the appearance of a little control box. It happens to be for an electric blanket, and, regardless of what the box is made of, regardless of its size, regardless, actually, of its usefulness, the appearance is patented. It makes no difference what it controls or even if it is a control box, so long as it looks like the patented design. This design patent has a certain element of artistic feeling in it, and invention and design patents get all confused with the aesthetics and art and all sorts of concepts with which both engineers and patent lawyers have some trouble in dealing. But our industrial design friends say that there's actually nothing to it. It's as simple as can be, except that they can't get design patents without patent lawyers to help them: so we're happy about that.

The other special classification I find of particular in-

terest because it deals with a hobby of mine. The other classification is plant patents. By special law, the government rewards persons who develop asexually produced plants, and gives them plant patents, and, of course, roses are the most frequent subject matter of plant patents. Readers who are rose enthusiasts know that many roses carry plant patent numbers. This is an example of a plant patent. They are not only interesting, but I think they are very beautiful. But if you have a fancy to decorate your office with a few of these (and it would be rather nice), they only cost 25 cents apiece, and it's pretty hard to get a painting of a rose that's as lovely as that for a quarter; it won't be easy because, in fact, it's almost impossible to get one of these for 25 cents. The government has to sell them for that price and of course they can't print them for anything like that. So, you've really got to have a good reason to get one. Otherwise the Patent Office will just tell you they're sorry, they're not for sale.

That, very briefly, is the subject matter of patents.

The law has a number of arbitrary rules and unless you comply with them you can't patent the thing you have invented even though you meet the general test. For one thing, if the device or process was patented or described in any printed publication anywhere in the world before your invention or discovery of it, or more than one year before you file your application, you can't get a patent on it. Also, if the thing was in public use or on sale in the United States for more than one year before the application, it cannot be patented. If either of these things are true, it's no longer new and you haven't given any information to anyone, so you don't deserve a patent.

If another engineer read a paper before an NSPE meeting which described the invention before you made it, you obviously haven't done anything. That engineer who read the paper gave the knowledge to the world and, if he took the proper steps, he might be entitled to a patent, but you certainly are not. If the paper was read by someone after you made your invention, you may still be the first inventor and in patent law the first inventor is the one who gets the patent. But still the law says that if this information was made public more than a year before you applied for your patent, you still can't have the patent even though you may be the inventor. The law has to draw a line somewhere in order to keep people from coming up many years later and claiming to have invented this thing and to have been working on it all this period of time; so the law arbitrarily says, one year.

That's important to you as engineers, extremely important, because it means that, if you read this paper or (in the next point of the law) if you develop an invention, and it goes into public use or it goes on sale, and you fail to apply for your patent within one year of that time, you cannot then secure a patent. The law also says that you have just one year from the time when it is in public use or on sale within which to apply for your patent.

The question of patentability lies principally on novelty and on utility. Novelty or newness, as I have said, measures whether or not you've done anything. It is tested in this way: when you file your patent application your papers are handed over to an engineer who usually also is a graduate lawyer in the Patent Office in Washington. They have some 700 highly trained examiners who are almost all graduate engineers. The examinations which they take for placement in the Patent Office are very difficult and it is an exceedingly unusual young graduate engineer who is able to pass the entrance examination into the Patent Office without special study for it. It is extremely difficult. These men work in divisions and groups and each division or group in the Patent Office has to do with a certain phase of general science. They may be classified down to where a small group is concerned solely with, for example, Carbon Chemistry. They have about 60 men in there, and they work exclusively in the field of Carbon Chemistry. They break that one down into subdivisions; there is a group of 15 or 20 men who have nothing to do with anything except Resin Chemistry, and in those men's hands, you will find, for example, all of the patent applications filed everywhere in this country having to do with any synthetic resin.

So as you can see, in a very short time, no matter what the field is, the men who are handling the applications in that field become thoroughly conversant with everything that is going on. They subscribe to and read thousands of technical journals; they have at their fingertips all of the two-and-a-half-million patents which have been issued in this country and which have been classified and divided into a most complete classification system, so that in certain classes there will be collected together all of the issued patents pertaining to any desired field of knowledge. They have at their hands all of the foreign patents. Our Patent Office gets copies of all of the patents issued in almost every country in the world. Of course, they don't get them from behind the Iron Curtain now, but patents don't really exist anymore in those countries.

The first thing that happens is that this expert who gets your application studies it so that he knows exactly what you have done. And as soon as he knows what you are claiming as your invention, it's up to him to find, somewhere in the issued patents, the publications, the encyclopedias, scientific journals, everything that he has at his fingertips, a disclosure of the same idea if he can. Because if he can, you can't have a patent, and if you do get a patent your patent would be invalid. It is a difficult job; difficult for the reason that there are thousands and thousands of sources that he must examine. It's difficult for the second reason that the examiner in Washington, no matter how highly trained and no matter how carefully he keeps up to date with published things, can't possibly know what's going on in a plant in, say, Columbus, Ohio. So he may not even know that the XYZ Manufacturing Company has been doing this thing for five years, because he just never came across it, or the XYZ Company never patented it—they just went ahead and did it; and if

(*Continued on page* 30)

About the Author . . .

Mr. Leonard

Henry K. Leonard, the patent law expert whose series of articles begins this month, has been associated with the Toledo, O., law firm of Owen & Owen since 1950. He began his career in the field of office management after graduation from the University of Wisconsin with a business administration degree in 1937. In 1941, he joined the staff of the Toledo patent law firm of Marshall & Marshall and simultaneously enrolled in the University of Toledo College of Law. His legal studies were interrupted by Navy service during World War II; but, in 1948, he received his degree *magna cum laude* and was also admitted to the Ohio bar.

One of the founders of The Toledo Patent Law Association, Mr. Leonard has had several patents of his own registered, thus giving him insight into the special problems of the inventor as well as the lawyer in the patent picture.

MEET ELGIN ROBERTSON

The Outstanding New A.I.E.E. President Sees Constant Challenge in Engineering

"ENGINEERS are concerned with men, materials, and money. None of these can be ignored. A great deal of the fascination of our profession comes from the new problems that are continually coming our way, and which require us to keep all these factors in their proper perspective and balance."—These are the words of Elgin B. Robertson of Dallas, Texas, one of NSPE's outstanding members and the 1953-54 president of the American Institute of Electrical Engineers.

Mr. Robertson, who has had a distinguished career as an electrical engineer and engineer-administrator, was born in Meridian, Texas, on June 4, 1893. He received his E.E. degree from the University of Texas in 1915 and then went to work for the Westinghouse Electric & Manufacturing Company (now Westinghouse Electric Corporation) as design engineer of power transformers. Following five years with that firm, he joined the Railway & Industrial Engineering Company of Greensburg, Pennsylvania, as chief electrical engineer, later, in 1924, becoming the Chicago division manager.

Spurred by ambition to use his talents in his own business, however, in 1928 he established the firm of Elgin B. Robertson, Inc., of which he has been president since its incorporation. In 1939 when the Plastics Manufacturing Company was formed, he also was made president of that organization, a position which he still holds.

During World War II he served with the War Production Board, first as production engineer, later becoming regional utility engineer and regional manager of production.

Aside from his regular business activities, Mr. Robertson has devoted his time and effort generously to both the technical and professional advancement of engineering. His work in the technical area has, of course, been with A.I.E.E. of which he is now president and which he has served in numerous other official capacities. In addition, in the professional field, he has been extremely active in NSPE on the national level and on the state and chapter levels with the Texas Society of Professional Engineers which he has also served as president.

Because these activities have made him particularly well-qualified to assess the value of the professional engineering association, the AMERICAN ENGINEER asked Mr. Robertson to comment upon this matter. In reply, he wrote as follows: "The technical engineering society, such as A.I.E.E., is concerned with the advancement of the theory and practice of electrical engineering. It provides its members with a forum where they can discuss new developments, new theories, and new practices. . . . The purely professional society, such as NSPE, is concerned with the social and economic welfare of the country and the individual engineer. It provides a forum where these particular problems are discussed and it furnishes the individual engineer with an opportunity to make his contribution to his country and his profession.

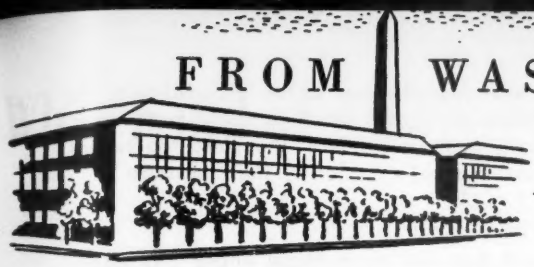
"The main value, therefore, of the engineering societies is that the individual is provided with the opportunity of making his own contributions to the general interest. Both societies are necessary to the well-rounded professional man. Selfishness has no part in the life of the professional man. It is his duty to do what he can to increase the standard of living, the comfort and well-being of mankind."

Mr. Robertson

AND in carrying out that duty, there is a continuing bright prospect for the engineer, according to Mr. Robertson, whose own particular interest has always been in the development of new equipment and new methods of manufacture. "As a young engineer," he reported, "I thought at one time that I had come into the profession too late for I saw all that had been done and could not see what the future held. Now I can see the tremendous progress that has taken place during my own lifetime, and I can also see that the future has even more to offer. The opportunity for the young engineer I believe is brighter than ever before. The problems to be solved are getting no easier; so the challenge to the engineer becomes greater all the time."

"To the engineer who wants his own business," he continued, in response to another AMERICAN ENGINEER question on the prospects for starting one's own firm today, "the opportunity is still here, and probably always will be. A new business is always a risk, and this should be taken into account. A new business is also full of fascinating problems that change from time to time. Our Government can create a favorable or unfavorable atmosphere, but I doubt if it will ever stop the daring and the enterprising engineer from doing that which he wants to do. It takes this to start and continue a business."

And all of this is excellent advice which Mr. Robertson has undoubtedly followed himself in achieving the preeminently successful place he holds today.—*End.*



FROM WASHINGTON

By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

The controversies of the Second Session of the 83rd Congress have started early—in fact some four months before the session actually begins on January 6, 1954, barring a now-unexpected special session.

The first major indication as to the tenor of what may be expected during the Second Session came in connection with one of the most controversial items of unfinished legislative business—amendment of the Taft-Hartley Act. During the campaign and in his State of the Union message last February, President Eisenhower stated: "We have now had 5 years' experience with the Labor Management Act of 1947, commonly known as the Taft-Hartley law. That experience has shown the need for some collective action, and we should promptly proceed to amend that act."

To implement his promise, the President set a labor-management committee to work under the auspices of the Labor Department, but this effort collapsed after one meeting at which the two sides could not even agree on procedural points. Meanwhile, extensive hearings were held by the Senate and House labor committees at which NSPE presented its views and recommendations on the aspects of the labor law affecting professional employees. NSPE and other engineering societies urged retention of the present provisions of the law which permit professional employees to have an independent vote in determining their views on collective bargaining proposals, and NSPE, in addition, recommended a further change in the law to permit all professional personnel, including both supervisory and non-supervisory employees, to work together in the professional, economic and social fields through a non-bargaining organization. (Complete NSPE testimony on this proposal was printed in the May, 1953, issue, American Engineer).

With the collapse of the labor-management group, efforts to draft suitable amendments to the labor law turned toward a more informal approach. White House advisors, representatives of the two congressional committees, spokesmen for labor and management and other experts met from time to time in an endeavor to draft amendments which would be acceptable to the President and which would form the basis of a Presidential message to Congress. There the factual story ends and hearsay, charges, counter-charges and accusations enter the picture.

There are two versions of the subsequent events. One is that the group mentioned above did arrive at an agreement, with objections noted by the Commerce Department representatives and management advisors, and the President overruled the objections by approving certain proposed changes. This version goes on to state that a Presidential message containing nineteen proposed changes to the law was prepared and was circulated to key Congressional leaders preparatory to official dispatch to the Congress the next day. While the "message" was in circulation for final editorial comment, Senator Taft died and for this reason it was decided to hold up the official "message" for a few days out of respect to the late Senate leader whose name was on the law which was to be amended. During the delay, it is alleged that the "message" was deliberately "leaked" to the Wall Street Journal which published the full text. A storm of protest went up from industry spokesmen against the proposed changes and the White House denied that any final agreement had been reached or that the "message" as published was anything more than one of many "working papers" on the problem. According to this version, then, the President had made an agreement on changes to the law and had broken that agreement when pressure was applied from those opposed to the suggestions. This is basically the reason given by Martin P. Durkin for his resignation as Secretary of Labor.

The other side of the story is that if any "agreement" existed, it was with certain White House staff members who had no authority to commit the President, and that the President definitely did not accept the proposed amendments. One in an excellent position to know the facts, Senator H. Alexander Smith of New Jersey, chairman, Senate Labor Committee, said he was completely mystified by the Durkin resignation and the charges of breach of an agreement. The New Jersey Senator also denied the statement of labor leaders that the proposed changes were in line with the views of the late Senator Taft on many points. "Senator Taft never agreed to the secondary boycott proposal, and he never agreed to the closed shop proposal," Senator Smith said.

There the matter stands and presumably discussions are continuing between Administration representatives and Congressional leaders on drafting appropriate recommendations for the next session on this burning question. There is little doubt that the episode has reduced the chances for harmony in amending the law and it is now considered doubtful by many that the incident can help but result in a

(Please turn the page)

bitter battle of accusations which will lead to no final action next year. Because of the importance of the nineteen points which the President either accepted or not, depending upon which version is believed, it will be well to have them in mind when the debate starts early next year. Here, then, are the salient features of the nineteen points as published in the Wall Street Journal's version of the "message."

1. Congress should remand jurisdiction over small employers to the States.
2. The definition of "supervisor" should be changed so it does not cover those whose only supervisory duties consist of giving directions to employees or assigning them work.
3. The definition of "agents" of labor unions should be changed in order that unions shall not be responsible for acts of individual members solely by reason of their union membership.
4. Some revision in connection with the delay in disposition of cases before the NLRB is needed, but a specific recommendation requires further study.
5. The union security (union shop) provision should be amended to permit a union to expel a member and require an employer to discharge him for disclosure of confidential information of the union, or reasonable cause to believe that the member belongs to or is sympathetic to the Communist party.
6. The law should be changed to make it clear that an employer may notify a union that job opportunities exist or give the union a reasonable opportunity to refer qualified applicants for employment.
7. The act should be amended to make it clear that an employer and a union may enter into an agreement specifying minimum training or experience qualifications or respecting priority in opportunities for employment.
8. In the case of industries in which employment is casual, temporary, or intermittent (construction, amusement, maritime), the employer should be permitted to enter into pre-hire contracts with unions and a union shop provision be permitted under which employees may be required to join the union within 7 days instead of 30 days after beginning of employment.
9. The act should be amended to exclude from the classification of prohibited secondary boycotts concerted activities on a construction project and rulings should be affirmed which permit boycott activities directed at work which has been "farmed out" and concerted activities wherever the employees of the "struck" employer are working.
10. The notice period prior to action to modify or terminate a collective bargaining agreement should be reduced from 60 days to 30 days and the penalty of loss of status of individual striking employees should be eliminated.
11. The act should be amended to prohibit the holding of an election for a period of four months after the commencement of a strike so the rights of striking employees on choosing a collective bargaining representative will not be lost unless the striker has been permanently replaced.
12. The de-authorization provision whereby employees may vote to rescind the authority of the union to enter into a union shop agreement should be eliminated.
13. Both parties to an agreement should be protected from being required to negotiate during its terms as to any subject not covered by the agreement unless the contract so authorizes or both parties mutually consent to reopening the contract.
14. The requirement that unions file certain additional information beyond that of their constitutions and bylaws, names and compensation of their officers and agents, manner by which the officers and agents were selected and amount of initiation fees and dues, should be eliminated.
15. The anti-communist oath provision applicable only to unions should be eliminated.
16. The mandatory requirement that the general counsel file for an injunction against a secondary boycott should be eliminated and injunctions in such cases should be discretionary as in other unfair labor practice cases; also, that no injunction or restraining order be allowed to be issued without notice and opportunity for hearing.
17. There should be a general rule fixing the dividing line between Federal and State jurisdiction, recognizing the paramount authority of the Federal law in the interest of uniformity throughout the United States. The States, however, should have the right to preserve public order within their boundaries and protect the health or safety of the State during any labor dispute which the Governor finds creates a state emergency, unless Federal action is taken under the national emergency provisions.
18. The law should be amended so that a check-off authorization for union dues, once given, shall be valid until it is revoked by the employee.
19. Employers should be permitted to waive voluntarily participation in the administration of union welfare funds.

These points, due to space limitation, are condensed and do not include the full reasoning in the "message" supporting the proposed change. Those particularly interested in one or more points may obtain copies of the full paragraph as originally published by writing to the Washington Office, NSPE. Please refer to the point on which the full text is desired by number.

What Kind of An Executive Does An Engineer Make?

BY ERNEST E. JENKS,
Vice President, Alexander Hamilton Institute

THERE is no doubt that engineers should make excellent executives. Their judgment is sound, conservative and clear of prejudice. Their reasoning qualities are mature and well-balanced. They have logical minds trained to the factual and the specific.

Engineers, further, should want to become executives—not only for financial reasons, but because of the opportunity such positions afford to exercise leadership, gain recognition and make fuller, more satisfying use of their mental resources.

Why is it, then, that the number of engineers who hold administrative jobs is disproportionately less than in other occupational groups?

It seems to me the answer is fairly obvious: As students—and early in their careers—engineers are occupied with the technical aspects of their profession.

Understandably, very little time is left for a study of business fundamentals. It is this lack of knowledge that confines the majority of engineers to technical assignments.

This point was well stated in an article titled "Executives Are Made . . . Not Born" by Peter F. Drucker in *Nation's Business*.

"A few years ago," Mr. Drucker wrote, "one of the large electrical manufacturing companies had to fill an important job: general manager of one of its big divisions. The outstanding man in the division was the chief engineer, a man of quite unusual abilities and achievements. Yet the company hesitated before promoting him. For the man's entire experience had been in engineering of a highly specialized kind. Engineering was important, but the division also faced a real sales problem.

Using subordinate personnel where possible, and releasing professional engineers for executive training is one way for firms to ease the "executive shortage."

"It employed some 4,000 men organized in a militant union. It was in the midst of a long-range expansion program with new plants going up in several places at once. Of all of these matters the chief engineer knew nothing.

" 'Sure,' the company's president said, 'we can give him specialists for every one of these jobs. But who is then going to run the division—he or the specialists? And even then who is going to keep all these functions in balance and look after the business as a whole?' It was because of this experience that the company went into executive development work in which it has since become one of the leaders. And the major aim of its program is still to make 'generalists' out of specialists—or at least, as one executive put it in a speech, to see to it that specialization does not unfit a man for the general view, the vision of the whole that distinguishes a business man from a mere technician.

"Nor is this just a big-company problem any longer. For the one fact that stands out in the development of the small or medium-sized company during the past twenty years or so, is precisely the extent to which it, too, has come to use specialists."

The dangers of over-specialization were brought home to me most strikingly in the case of two young engineers who were passed over for promotion in favor of an outsider.

Honestly bewildered, they approached the vice-president of their firm and said:

"You know our records and length of service with the company. We both thought we were in direct line for promotion. Yet, when the branch managership became vacant, you chose an outsider."

"As you know," the V. P. replied, "ours is a technical organization, and you are technically-trained men. Neither of you has had any business training or experience beyond one single department.

"The manager of our branch office has to deal with all kinds of business problems . . . with sales, finance, accounting, merchandising.

"Now I ask you, what would you have done in my place?"

EACH of the men went away very thoughtful. What happened to one of them, I do not know; but the other undertook the study of business principles and is, today, an outstanding executive.

Another incident—on the brighter side—concerns a small town engineer who learned that an important company in New York was seeking a manager for one of its foreign offices. He obtained an appointment with the president of the firm. There was no doubt about his fitness from an engineering standpoint—the question was whether his knowledge of business methods was sufficient.

"Test me," he said to the President. "Send out to your files and bring in questions of the sort I will be expected to handle.

"I have been fitting myself for an opportunity like this for a year. I have studied the fundamentals of costs and accounting, advertising and sales, traffic, foreign trade and corporation finance. Give me a chance to prove my qualifications for the job."

At the end of the interview, the contract was signed at a salary of $10,000 a year. In that single hour, his salary

bitter battle of accusations which will lead to no final action next year. Because of the importance of the nineteen points which the President either accepted or not, depending upon which version is believed, it will be well to have them in mind when the debate starts early next year. Here, then, are the salient features of the nineteen points as published in the Wall Street Journal's version of the "message."

1. Congress should remand jurisdiction over small employers to the States.
2. The definition of "supervisor" should be changed so it does not cover those whose only supervisory duties consist of giving directions to employees or assigning them work.
3. The definition of "agents" of labor unions should be changed in order that unions shall not be responsible for acts of individual members solely by reason of their union membership.
4. Some revision in connection with the delay in disposition of cases before the NLRB is needed, but a specific recommendation requires further study.
5. The union security (union shop) provision should be amended to permit a union to expel a member and require an employer to discharge him for disclosure of confidential information of the union, or reasonable cause to believe that the member belongs to or is sympathetic to the Communist party.
6. The law should be changed to make it clear that an employer may notify a union that job opportunities exist or give the union a reasonable opportunity to refer qualified applicants for employment.
7. The act should be amended to make it clear that an employer and a union may enter into an agreement specifying minimum training or experience qualifications or respecting priority in opportunities for employment.
8. In the case of industries in which employment is casual, temporary, or intermittent (construction, amusement, maritime), the employer should be permitted to enter into pre-hire contracts with unions and a union shop provision be permitted under which employees may be required to join the union within 7 days instead of 30 days after beginning of employment.
9. The act should be amended to exclude from the classification of prohibited secondary boycotts concerted activities on a construction project and rulings should be affirmed which permit boycott activities directed at work which has been "farmed out" and concerted activities wherever the employees of the "struck" employer are working.
10. The notice period prior to action to modify or terminate a collective bargaining agreement should be reduced from 60 days to 30 days and the penalty of loss of status of individual striking employees should be eliminated.
11. The act should be amended to prohibit the holding of an election for a period of four months after the commencement of a strike so the rights of striking employees on choosing a collective bargaining representative will not be lost unless the striker has been permanently replaced.
12. The de-authorization provision whereby employees may vote to rescind the authority of the union to enter into a union shop agreement should be eliminated.
13. Both parties to an agreement should be protected from being required to negotiate during its terms as to any subject not covered by the agreement unless the contract so authorizes or both parties mutually consent to reopening the contract.
14. The requirement that unions file certain additional information beyond that of their constitutions and bylaws, names and compensation of their officers and agents, manner by which the officers and agents were selected and amount of initiation fees and dues, should be eliminated.
15. The anti-communist oath provision applicable only to unions should be eliminated.
16. The mandatory requirement that the general counsel file for an injunction against a secondary boycott should be eliminated and injunctions in such cases should be discretionary as in other unfair labor practice cases; also, that no injunction or restraining order be allowed to be issued without notice and opportunity for hearing.
17. There should be a general rule fixing the dividing line between Federal and State jurisdiction, recognizing the paramount authority of the Federal law in the interest of uniformity throughout the United States. The States, however, should have the right to preserve public order within their boundaries and protect the health or safety of the State during any labor dispute which the Governor finds creates a state emergency, unless Federal action is taken under the national emergency provisions.
18. The law should be amended so that a check-off authorization for union dues, once given, shall be valid until it is revoked by the employee.
19. Employers should be permitted to waive voluntarily participation in the administration of union welfare funds.

These points, due to space limitation, are condensed and do not include the full reasoning in the "message" supporting the proposed change. Those particularly interested in one or more points may obtain copies of the full paragraph as originally published by writing to the Washington Office, NSPE. Please refer to the point on which the full text is desired by number.

What Kind of An Executive Does An Engineer Make?

BY ERNEST E. JENKS,
Vice President, Alexander Hamilton Institute

THERE is no doubt that engineers should make excellent executives. Their judgment is sound, conservative and clear of prejudice. Their reasoning qualities are mature and well-balanced. They have logical minds trained to the factual and the specific.

Engineers, further, should want to become executives—not only for financial reasons, but because of the opportunity such positions afford to exercise leadership, gain recognition and make fuller, more satisfying use of their mental resources.

Why is it, then, that the number of engineers who hold administrative jobs is disproportionately less than in other occupational groups?

It seems to me the answer is fairly obvious: As students—and early in their careers—engineers are occupied with the technical aspects of their profession.

Understandably, very little time is left for a study of business fundamentals. It is this lack of knowledge that confines the majority of engineers to technical assignments.

This point was well stated in an article titled "Executives Are Made . . . Not Born" by Peter F. Drucker in *Nation's Business*.

"A few years ago," Mr. Drucker wrote, "one of the large electrical manufacturing companies had to fill an important job: general manager of one of its big divisions. The outstanding man in the division was the chief engineer, a man of quite unusual abilities and achievements. Yet the company hesitated before promoting him. For the man's entire experience had been in engineering of a highly specialized kind. Engineering was important, but the division also faced a real sales problem.

Using subordinate personnel where possible, and releasing professional engineers for executive training is one way for firms to ease the "executive shortage."

"It employed some 4,000 men organized in a militant union. It was in the midst of a long-range expansion program with new plants going up in several places at once. Of all of these matters the chief engineer knew nothing.

" 'Sure,' the company's president said, 'we can give him specialists for every one of these jobs. But who is then going to run the division—he or the specialists? And even then who is going to keep all these functions in balance and look after the business as a whole?' It was because of this experience that the company went into executive development work in which it has since become one of the leaders. And the major aim of its program is still to make 'generalists' out of specialists—or at least, as one executive put it in a speech, to see to it that specialization does not unfit a man for the general view, the vision of the whole that distinguishes a business man from a mere technician.

"Nor is this just a big-company problem any longer. For the one fact that stands out in the development of the small or medium-sized company during the past twenty years or so, is precisely the extent to which it, too, has come to use specialists."

The dangers of over-specialization were brought home to me most strikingly in the case of two young engineers who were passed over for promotion in favor of an outsider.

Honestly bewildered, they approached the vice-president of their firm and said:

"You know our records and length of service with the company. We both thought we were in direct line for promotion. Yet, when the branch managership became vacant, you chose an outsider."

"As you know," the V. P. replied, "ours is a technical organization, and you are technically-trained men. Neither of you has had any business training or experience beyond one single department.

"The manager of our branch office has to deal with all kinds of business problems . . . with sales, finance, accounting, merchandising.

"Now I ask you, what would you have done in my place?"

EACH of the men went away very thoughtful. What happened to one of them, I do not know; but the other undertook the study of business principles and is, today, an outstanding executive.

Another incident—on the brighter side—concerns a small town engineer who learned that an important company in New York was seeking a manager for one of its foreign offices. He obtained an appointment with the president of the firm. There was no doubt about his fitness from an engineering standpoint—the question was whether his knowledge of business methods was sufficient.

"Test me," he said to the President. "Send out to your files and bring in questions of the sort I will be expected to handle.

"I have been fitting myself for an opportunity like this for a year. I have studied the fundamentals of costs and accounting, advertising and sales, traffic, foreign trade and corporation finance. Give me a chance to prove my qualifications for the job."

At the end of the interview, the contract was signed at a salary of $10,000 a year. In that single hour, his salary

jumped $7,000 because he had supplemented his technical training with a knowledge of business procedures.

And speaking of salaries, the American Society of Mechanical Engineers" once made a detailed analysis in which it was shown that engineers who had managerial ability made substantially more money than those who had technical skill only.

This is hardly surprising because, as an engineer approaches the top of his profession, his duties become less technical and more administrative in nature.

There was a time when a knowledge of production was all that was required of a plant manager. Today, the men responsible for production not only manufacture an acceptable product, but they also understand distribution to the point where they are able to discuss packaging with the sales manager . . . and they are frequently called in to talk over financial problems pertaining to production. Instead of being simply plant-minded, they are now business-minded.

THIS is necessary because all of the functions of modern business are so closely integrated: Accounting is the last operation of a business, but it is also the first; marketing may appear to follow production, yet in actual practice, marketing considerations come before production. There is an absolute interdependence of the main divisions of business, and men who aspire to executive positions must have a working knowledge of each.

Walter von Pechmann, writing in *Industrial and Engineering Chemistry*, says:

"Modern chemical manufacturing requires specially trained chemists and chemical engineers. Chemists and chemical engineers are therefore inclined to narrow their interests, become one-track minded, rather than broaden their knowledge in phases of general business. In doing so they disqualify themselves for top executive positions. By no means does this imply that chemists and chemical engineers who work on special assignments do not have a chance for administrative positions. It does mean, however, that they must make a special effort to keep in contact with other phases of business in their organization. This applies also to production executives whose work is mostly along chemical lines . . .

"The chemical industry has lately been showing a marked preference for filling the top positions with men who have had a general business education. This proves beyond question that a working knowledge of all divisions of business is necessary."

A CURIOUS situation, which should be of particular interest to engineers, exists in the business world today.

The average age of the country's executives has risen steadily; and there is an acute shortage of trained replacement material. Many authorities have pointed to this shortage as a genuine threat to the nation's productivity.

Business Week, for example, says:

"It's a seller's market today for the $25,000--year man . . . Most of the trouble traces pretty directly to the tremendous changes the war has caused in business. Typically, you'll find companies where the management is:

"Too old at the top and not adequately backed up by rising young men. Particularly in non-war industries, many companies have been closely run for a decade by a small group at the top. Now these men are thinking about retirement or are hit by the high death rate which has been a war aftermath among older executives. But the men below them have never had real responsibilities, don't look suitable for top jobs.

"Too youthful and inexperienced. Some firms which grew up during the war are headed largely by men who know a lot about getting out production at any cost, about wrangling materials from suppliers, about dealing with the Government. But they're not too well equipped to deal with the rising problems of cost trimming, of selling in a buyer's market, or shaping up an organization for the long haul.

"Under-staffed. During the war years, many a company took on new jobs, new plants, new products right and left, shoe-horned them somehow into the old organization. Now, grown far beyond prewar size, such a company needs an enlarged corps of top executives to staff the operation."

Actually, the real need is for executives with an engineering background—technical men who can "run the show." Science is playing an increasingly important role in industrial development and technically-trained men are, of course, better able than others to understand and direct these developments.

Thus the engineer is ideally equipped to take advantage of the greatest opportunities ever offered by business and industry. He has a distinct advantage over others because anybody who has mastered the intricacies of engineering

Engineering executives are vital to many industries. Here two from the Aluminum Co. of America look over the intricate scale model of the Air Force Heavy Forging Press Plant being built at Alcoa's Cleveland (O.) Works.

can learn business fundamentals within a relatively short time.

LET me point out an encouraging fact in that connection which you may not have considered: You do not have to learn a different set of rules for various types of businesses. The largest, most complex corporations operate on the same fundamental principles as the local manufacturer, the corner retail store and the "one man" business.

These essentials, in one form or another, apply to all business:

1. A product or service in demand and potentially acceptable;
2. Sufficient capital;
3. The correct form of organization;
4. Competent executives;
5. Well-defined policies;
6. Strategically-located plants and the right types of buildings and machinery;
7. Production on an efficient and economical basis;
8. A skilled and loyal working force;
9. Efficient, economic distribution;
10. An adequate accounting system;
11. Capable financial control.

These elements are present in an enterprise only because of the competence, skill, judgment and knowledge of its administrative staff. When they are not present, the business inevitably fails.

Roy A. Foulke, in his authoritative book *Behind the Scenes of Business,*" says:

"It is generally reported that the largest percentage of failures is directly charegable to poor management, closely followed by lack of capital. It is quite likely, however, that many of the failures attributed to other causes such as competition, over-trading speculation, general business conditions, and even unseasonable weather, would have been anticipated under more capable, far-seeing, conscientious managcment."

Whether you eventually plan to go into business for yourself—or elevate your status to that of an executive—it is clear that you must be familiar with the inner workings of business . . . of finance, accounting, marketing and production.

And, as I have tried to make clear, there never was a more opportune time than the present to capitalize on your valuable training as an engineer.—***End.***

About the Author . . .

Mr. Jenks

Ernest E. Jenks, vice-president of the Alexander Hamilton Institute and author of this article, has served with the Institute in various capacities since 1915, the year of his graduation from Cornell with a degree in economics. He has traveled extensively for the firm, establishing branches in Australia and in Latin America.

His experience has also included close contact with a wide variety of business organizations which he has served as a director. These include a large luxury hotel in New York City, a producing oil company, and a land company with its interests largely in grazing leases as well as oil exploration and mining.

What Jobs In Enginering Pay the Best Money?
See page 30

NSPE Fall Meeting

Indianapolis To Be Scene Of Professional Assembly; Governor Craig To Speak

INDIANA Governor George N. Craig and NSPE President T. Carr Forrest, Jr., will be the principal speakers during the National Society's fall meeting, which is scheduled for November 6 and 7 at the Hotel Severin in Indianapolis. Governor Craig will deliver his address at the Friday evening dinner-meeting, while President Forrest will speak at the annual banquet of the Indiana Society of Professional Engineers, which is scheduled for Saturday evening. This regular fall conference of NSPE is being held in conjunction with the annual meeting of the Indiana Society, and it is expected that it will attract many local P.E.'s and members of neighboring State Societies, as well as national officers and directors.

The expanded NSPE program for 1954, Society activities with respect to the "Freedom of Association" amendment and other matters relative to collective bargaining, the expansion of NSPE's public relations program, and the problem of headquarters housing are among the primary topics on the fall meeting agenda. Among other items to be discussed are: additional legislative matters, such as social security for self-employed engineers; a stepped-up membership program; increased activity in the development of professional consciousness among students and young engineers; several problems of ethical practice; recent developments regarding improved registration laws; plans for the 1954 celebration of National Engineers' Week, and the preliminary results of the Third Executive Research Survey.

You Are Invited . . .

Why not attend the meeting in Indianapolis? You and your guests will enjoy not only the professional discussions but the social events as well. Plan now to come to the Hoosier City.

Of particular interest to those in attendance will be the Saturday morning program which will cover the three general topics of Unity, Public Relations, and Young Engineers. The three levels of the Society's administrative organization will be represented in the discussion of these subjects, as the chairman of each national committee concerned, a representative of a parallel state committee handling the same problem, and a representative of a similar chapter committee will each present pertinent material. Informal discussion of all facets of the three broad topics will then follow.

Members of the National Executive Committee are expected to arrive in Indianapolis on November 5 to consider some of the administrative problems of the Society prior to the inauguration of the professional sessions on the 6th.

Members of the Indiana Society, who are acting as hosts for the meeting, are also planning a schedule of varied social events and a special program for the ladies. At the Saturday banquet, at which Mr. Forrest will speak, the National officers will be the guests of the Indiana Society.

J. B. Wilson of Indianapolis is president of the Indiana group.

Engineers in the Headlines

William F. Steuber, Jr.: Author

WILLIAM F. STEUBER, JR., assistant to the Wisconsin State Highway Engineer and a member of the Southwest Chapter, Wisconsin Society of Professional Engineers, has just achieved a life-long ambition to become an author. As a result, he is spending a lot of his spare time autographing copies of a new book—*Us Incorporated*—a novel about a young boy of today which has just been published by the Bobbs-Merrill Company.

William F. Steuber, Jr., above, following in the footsteps of one of his early literary idols, Mark Twain, has introduced an exciting new juvenile character—Page Kester—to the reading public. Not content to relax in the light of the favorable notices for *Us Incorporated*, Engineer Steuber is already at work on a second novel.

Always getting a "tremendous bang" out of youngsters around 11, 12, and 13, their viewpoint on life, and the things in which they are interested, the new author reports that he has had the idea for his book in the back of his mind ever since college days at the University of Wisconsin, where he managed to study a lot of English as well as engineering. It wasn't until 1945, however, that he really started writing in earnest, sandwiching this new work into evening and weekend hours. Now he has come up with a first novel that has been praised by book reviewers across the country for its realistic and appealing portrait of a contemporary 12-year-old, about which one critic has said: "Youngsters will enjoy the book for its action and story; adults will find other and deeper qualities in it."

Page Kester, who recounts the story, is the leading character; and he and his friend, Eddie Accoli, with whom he shares many exciting experiences, establish the "corporation" which gives the book its unusual name, as they strive to become "assets" rather than "liabilities."

A native of Madison, Wisconsin, where he still resides, engineer-author Steuber has served with the State Highway Commission in various capacities ever since his graduation from the University of Wisconsin in 1930, with the exception of a three-year leave of absence for a war service appointment at the U. S. Forest Products Laboratory in Madison. His knowledge of both highway problems and writing brought him additional acclaim recently when he won a $3,000 award, one of the top prizes in the General Motors Better Highways Contest, for his essay on the contest topic —*How to Plan and Pay for the Safe and Adequate Highways We Need.*

In his leisure time Mr. Steuber is now working on a second novel while Page Kester, described by the *New York Times*' Orville Prescott as "just the kind of boy who would grow up to be an engineer some day," provides much entertaining reading as the hero of *Us Incorporated.*

James J. Ryan: Inventor

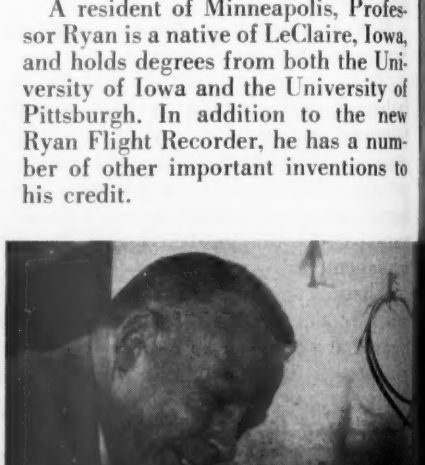
WHILE Mr. Steuber is collecting favorable notices on his book, James J. Ryan, a member of the Minnesota Society of Professional Engineers and a former national director of NSPE, is being congratulated on having his invention—the Ryan Flight Recorder—accepted for production by the Mechanical Division of General Mills, Inc. Mr. Ryan, who holds an engineering position with General Mills, is also a professor at the University of Minnesota.

His new non-electronic recorder, which is the result of one of several investigations he has made into the safety of aircraft and automobiles, weighs only 16 pounds. Its purpose is to record on an aluminum foil the altitude, airspeed, and vertical acceleration at any time of aircraft in flight. An additional element allows it to measure flight direction.

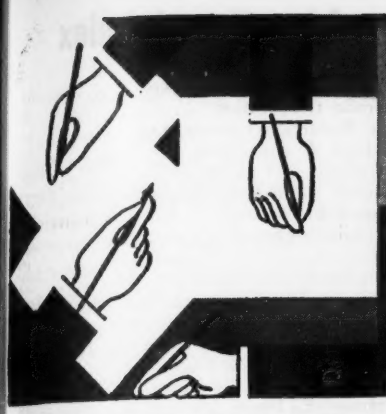
It is expected that it will be installed in airplanes as a safety measure in determining the flight path of the aircraft in order that atmospheric conditions which are encountered during flight may be thoroughly studied. The CAA is particularly interested in putting the recorder into use so that in case of an air mishap or crash the cause of the difficulty and the subsequent events in the air may be recorded. The instrument also is useful for determining economical flight paths for commercial airlines and for pilot analysis of the records with a view toward the eventual elimination of route problems and the improvement of safety.

A great deal remains unknown about atmospheric conditions which cause severe vertical bumps to planes. Professor Ryan's recorder measures these bumps to determine their severity, consequently indicating the degree of post-flight inspection necessary for safety. Thus, a slight bump would not require the complex structural examination which exceedingly hard bumps would necessitate.

A resident of Minneapolis, Professor Ryan is a native of LeClaire, Iowa, and holds degrees from both the University of Iowa and the University of Pittsburgh. In addition to the new Ryan Flight Recorder, he has a number of other important inventions to his credit.



An engineer-inventor of long standing, James J. Ryan, above, has aroused nationwide interest and enthusiasm recently with his latest invention—the Ryan Flight Recorder. Once installed in an aircraft, the new instrument, which Professor Ryan is shown explaining, will record flight data that will be invaluable in the development of safety measures and devices.



Professional POSTSCRIPTS

Welcome back. We missed you last month because space limitations forced this feature from the magazine, but we can make up for lost time this issue because we have two fine pieces written by our engineer readers. The first is by Engineer Don Purington of Houston, Texas, and he is writing about professional ethics. Here, then is Engineer Purington.

—PP—

"The Committee was requested to give further consideration to the Revision of the Professional Engineer's Creed, and the possibility of . . . ."

Brothers! Can you spare a word? Every year when the Directory Issue of our State Society publications comes out, we open it carefully, peeking cautiously from Page 1 to Page 2, etc., because we have been bludgeoned each year by Codes, Canons, Rules of Practice in this publication and each year they are getting longer and more numerous. By and by, they will be voluminous and bulky as the Contract Specifications. Can't we stop somewhere?

Our Code of Ethics is brief and to the point. We have no complaint for it.

But these Canons of Ethics for Engineers! That title must have been chosen by a Spec writer! Don't strain yourselves, the word "Canon" is just another name for rule.

Just for fun, we have tried to analyze and digest these so-called Canons—and Boy! Are they Indigestible?

Taking them one at a time, we come out like this:

1. Never miss an engineering bull session. Be sure to impress young engineers. Sweat out as many committee sessions as possible, and, regardless of your ability—fill the scientific and engineering press with as many words as possible (just like these Canons).

2. Watch your advertising. Give a customer your name and maybe tell him the location of the jobs you have done, but always assume that he is fully qualified to judge the quality and understand the purpose of engineering work. You must not boast or brag about your work in any way.

3. If you talk to a reporter or address a civic club avoid all adjectives and accolades and be sure you make your statements dry as dust.

4. Always get your safety helmets, shoes and goggles and keep the barricades in place.

5. If you are on the witness stand be sure you have your facts.

6. Never comment on federal, state or local government performance, unless you can get paid for it, and be sure you tell who paid you.

7. This sounds like No. 3 and No. 6, in different language. It recommends staying away from public meetings unless you are hired to attend.

8. Remember that an engineer is a paid servant and must always keep his place.

9. Always be fair and honest (Remember the Golden Rule).

10. Be sure that you warn your client or employer that you have stock in the Podunk Pump Company—if he wants to use a Podunk Pump.

11. Re-read Section 4 (This is where the needle stuck on the recording machine).

12. Never let a client think he knows more than you do. Make him take your plans and specifications and like them.

13. Never claim that you know everything. Be generous and give as many consulting specialists a chance to get on your client's payroll.

14. Don't be gabby. Keep your client's business under your hat.

15. Don't be avaricious and try to collect fees from more than one party to a contract without giving them all notice. If you can do it—you're smart.

16, 17, 18. Just read 15 over again three more times, they all say practically the same thing.

19. Get a suit of armor, a lance and a buckler and crusade for the honor of the Profession—(Remember 2, 3 and don't advertise).

20. Again! Don't advertise, but by some slight-of-hand make sure that it is an engineer who gets credit for the work. (Generally—the boss will make sure he gets it).

21. Be sure that you make your fee charges high enough, and don't try to take some other engineer's customers.

22. Let your engineering employees have time off to take in the conventions.

23. Never criticize another engineer, but be sure to call the cops if you know one who is beating a customer.

24. Re-read 23. This one recommends that you write a thesis or a tome to express your feelings and publish it in an engineering journal (where the public will not read it, just as we are doing here).

25. Don't try to horn in when another engineer has a client on the string.

26. You must be so honorable and idealistic that you will not think of doing work for a lower fee, or with side inducements, even if you are cold and hungry.

27. If you have a salaried job—stay salaried, even if you cannot support your family on it. You must not work outside of office hours and spoil someone's consulting fees.

28. Don't get mixed up with crooks or sharpers, if that's your only choice get a laborer's job. Bricklayers get good rates.

In addition to the "Canons," we now have "Rules of Practice," which is another repeat of what has been said before, and "Joint Rules of Practice Between Architects and Engineers," and "Employment Practices," etc., etc.

It's no wonder there is a shortage of Engineers!

By the time a man gets through reading all these rules and memorizing them, he realizes it will be much easier to be a bricklayer.

—PP—

We are all interested in engineering education. It is a serious problem this educating our young men and it deserves the attention it receives. Writing on this subject this month, is Engineer Carroll D. Billmyer of Kingston, R. I. Engineer Billmyer:

—PP—

Feeling that THE AMERICAN ENGINEER is an appropriate place for a discussion on engineering education, I offer the following for publication as a letter to the editor or in the "Professional Postscripts" feature.

May I be permitted to make some observations based on my experience of twenty-eight years as a teacher of engineering and ten years of industrial practice. I question some of the trends in undergraduate engineering education, for I have found nothing to convince me that we are not on the wrong track.

May I add that I know of no group of men more prone to self-examination with a view to improvement than professional engineers or engineering educators. Truly they have followed the precepts of Doctor Wickenden in his epoch making address "The Second Mile." I question not the intent but the method. This pertains to the allocation of time in curricula already overcrowded by the inclusion of the constantly increasing subject matter of new technical knowledge and the admitted need for more consideration of the humanities.

Regarding the former, I continue to believe that the technical part of the undergraduate program should be broad and that specialization be reserved for graduate work. How else is it possible for one to use this detailed information properly unless he knows how the parts fit together to make the completed whole? This same question applies to a general knowledge of the economic and political system in which we live.

The engineer does not live in a vacuum insulated from his fellow citizens. He has both rights and duties if our country is to survive. For the reason to be given later, I believe he should have a required course in the fundamentals of business, giving a brief survey of how our economic system works and why it is different from other systems supposedly superior to it.

It is admitted that most of us, regardless of profession, need more culture. What is not admitted is that engineers, as a group, are more deficient in this respect than other groups. Since my graduation in 1914 I have met many men of all professional groups and have found that the engineering profession includes the same proportion of cultured men as do other groups.

If we must include more cultural subjects in an already over crowded curriculum, what is the best method? Shall we provide space for a fixed percentage of "free electives," hoping that the young inexperienced may choose of greatest value, or shall we require him to follow a course chosen by more experienced engineers? I have seen students choose, in spite of contrary advice, both technical and non-technical electives which later proved to be of little need and which required the time which could have been more usefully applied to other subjects. This same criticism applies to the economic field.

The engineer should be vitally concerned with the preservation of the system of free enterprise on which perhaps more than anyone else, he depends both for an opportunity to exercise his abilities and for a rising standard of living. His technical progress depends on his freedom to make his own decisions. How will he know this if neither in preparatory school nor in his undergraduate technical curricula is he given the basic information required?

In view of the above, I recommend that every undergraduate engineering curriculum contain one or more required courses, preferably taught by engineers, giving the student a brief well rounded picture of our economic system which he can understand. Rather than eliminate truly technical courses, I recommend the elimination of some of the time reserved for electives. These recommendations are made with a view to improving the usefulness of the engineer to himself and the social system of which he is a part.

As suggested by Doctor Wickenden, his leisure time should be devoted to cultural pusuits. Encouragement to do

(*Continued on page* 29)

(EDITOR'S NOTE: *All those desiring to list their meetings under Dates to Remember should send* COMPLETE *information, including date and place, directly to the American Engineer.*)

Missouri Society of Professional Engineers—Annual Meeting, October 16, 17. Tiger Hotel, Columbia, Missouri.

National Council of State Boards of Engineering Examiners—Annual Meeting, October 29, 30, 31. Plaza Hotel, San Antonio, Texas.

Indiana Society of Professional Engineers—Annual Meeting. November 6, 7. Severin Hotel, Indianapolis, Indiana.

NSPE Board of Directors Meeting—November 6, 7. Severin Hotel, Indianapolis, Indiana.

Advertisers' Index

Adache & Case, Engineers 37
Aerofin Corporation 16
Air Reduction Canada, Ltd. 16
Auburn & Associates, Inc. 37
Backlund and Jackson, Inc. 35
George W. Brandt, Engineer 37
Brown & Blauvelt 36
Capitol Engineering Corporation 37
The Carter-Waters Corporation 16
Commonwealth Associates, Inc. 33
Consoer, Townsend and Associates .. 35
Cormit Engineering Company 38
Crescent Engineering Company, Inc. . 35
DeLeuw, Cather & Company 33
Fred S. Dubin Associates 33
Thomas E. Duce Associates 38
Eastern Heat Treating & Brazing Corp. 38
Ehrco Die Casting Service 38
Engineering Drafting Service 36
Engineers Testing Labroatory, Inc. .. 38
Eustis Engineering Company 35
Fairchild Aircraft Division 1
Fay, Spofford & Thorndike 37
Forrest and Cotton 38
Framingham Sand & Gravel Co. 39
Frazier-Simplex, Inc. 37
Gannet, Fleming, Corddry & Carpenter, Inc. 37
Gustave M. Goldsmith 37
Greer & McClelland 36
Frank E. Harley & Associates 36
C. M. Hathaway 35
The Hinchman Corporation 35
Allan T. Holloway & Associates 36
R. S. Houge 35
Howard, Needles, Tammen & Bergendoff 36
G. A. James & Associate Engineers, Inc. 37
Kennedy-Riegger Drilling Co., Inc .. 16
Knappen-Tippetts-Abbett-McCarthy .. 37
Koppers Company, Inc. 3
Robert C. Lafferty 38
Ellis M. Landis 37
Law-Barrow-Agee Laboratories, Inc. . 35
Lawrie & Green & Associates 37
Loedding Engineering Co., Inc. 37
Madigan-Hyland 37
Emmet J. McDonald 37
John W. Medlin 36
Modjeski and Masters 37
Mountain State Fabricating Co. 36
James P. O'Donnell 37
Oklahoma Testing Laboratories 37
Parsons, Brinckerhoff, Hall & Macdonald 37
John W. Pennel 35
Pitman Publishing Corporation 38
Potteiger Company Inc. 38
Process Designs, Inc. 36
Revolvator Company 38
Cyrus Wm. Rice & Co., Inc. 35
Robert and Company Associates 35
F. A. Sando 37
The George Scherr Company 37
W. W. Slocum & Co. 37
South Florida Test Service 37
D. B. Steinman 37
Syska & Hennessy, Inc. 37
Thomas Gas Contractors, Inc. 37
John I. Thompson & Company 35
Toledo Testing Laboratory 37
United States Testing Company, Inc. 36
Emerson Venable 37
Warner Engineering Co. 37
Edward J. White Company 35
Harold H. White 16
E. J. Will & Company 35
A. W. Williams Inspection Co. 35
J. H. Williams & Co. 35
Wilson & Company 36
Yokley and Waggoner 37

(For Advertising Representatives, See page 4)

Postscripts

(Continued from page 28)

this is also one of the functions of every instructor who handles undergraduate work. Ability to inspire is a more important qualification for an instructor than the mere accumulation of knowledge.

—PP—

And, to end with this month, a short philosophical piece by Engineer Elmer N. Iberg of Marion, Ky. By the way, why don't you satisfy that yen to write and submit your products to Professional Postscripts? Remember, it's your feature.

—PP—

Despite the retarding effects of the predatory and parasitic elements of human society, all progress made by man on this earth has been the result of effort and intelligence.

Effort is not only normal to progressive mankind, it is his natural action and his natural reaction. Progressive mankind can neither be stopped from working nor from thinking. Nor can it be halted from the interchange of products or ideas; the exchange of the skill and knowledge of one group for that of another.

Man has been at work for several million years on this earth and there is little reason to believe he will change face—even though the perverted minorities yell themselves hoarse in proclaiming things otherwise.

It is the privilege and the responsibility of the Engineer to lead and direct much of this activity in the face of unlimited obstruction and obstructionists; the show stealers, the profit grabbers, the uninformed and those of limited horizons.

Except at the cost of the destruction of all Civilization, this work must go on; in spite of these obstructionists of all hues who today have permeated every phase of human endeavor—including government.

How to Learn More About Your Profession

One of the highlights of NSPE's 19th Annual Meeting was a symposium entitled "Programs for Professional Development," featuring speeches by four of the nation's outstanding professional engineers. The four papers (listed below) are now available *free*.

1. **"The Need for More Effective Professional Action," by Alex Van Praag, Jr., P.E., NSPE Past President.**

2. **"The Professional Development of Engineers and Scientists in Industry," by Clark Ransom, P.E., General Electric Company.**

3. **"NSPE's Development of Professional Objectives," by Perry Ford, P.E., Past President.**

4. **"The Place of Registration in Professional Development," by Karl B. McEachron, P.E., past chairman, Massachusetts Registration Board for Professional Engineers.**

Use the Convenient Coupon Below—Remember, No Charge.

Order now by number shown beside titles—Limited Supply Available.

Available Free

•

Order Today!

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
1121 Fifteenth Street, N.W., Washington 5, D. C.

Please send me without charge .....copies each of the booklets checked below.

☐ 1 ☐ 2 ☐ 3 ☐ 4

NAME .....

STREET .....

CITY .....**STATE** .....

Patents

(*Continued from page* 19)

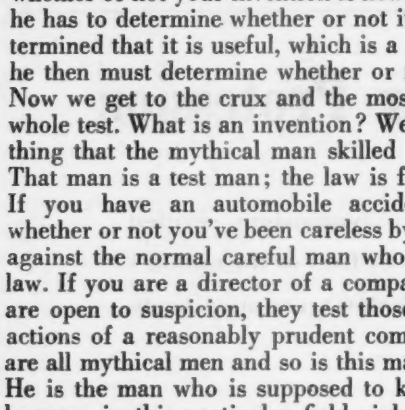
they did just go ahead and do it and not patent it, they didn't think to send information to the Patent Office about it. That's a highly advisable action. If you don't want to patent it yourself, there is a way to keep someone else from patenting it. You don't want to wake up and suddenly see that your competitor has a patent on the thing that you've been doing for a year or two, because it may involve you in a lawsuit to prove that you've been doing it for that length of time. And if you prove that, he can't stop you from doing it. It's very simple; if you don't want to patent it, send information about it to the Patent Office and no one else can patent it either. Hardly anyone does that, but it is an interesting point and well worth considering.

AFTER the examiner studies all these things, he decides whether or not your invention is new. And if it's new, then he has to determine whether or not it's useful. Having determined that it is useful, which is a relatively simple test, he then must determine whether or not it's an invention. Now we get to the crux and the most difficult part of the whole test. What is an invention? Well, it's not the sort of thing that the mythical man skilled in the art would do. That man is a test man; the law is full of such test men. If you have an automobile accident, they determine whether or not you've been careless by testing your actions against the normal careful man who is the keeper of the law. If you are a director of a company and your actions are open to suspicion, they test those actions against the actions of a reasonably prudent company director. They are all mythical men and so is this man skilled in the arts. He is the man who is supposed to know everything that happens in this particular field right up to this minute. Of course, there isn't any such man but your invention is tested in that way because you can't have an invention unless you've done something beyond what was done right up to this minute. So the Patent Office examiner substitutes himself for the mythical man, and, on the basis of all this scientific information, he tries to decide whether or not the step which you have taken from one second ago to right now is a step which normally would be taken by this mythical skilled man faced with the problem with which you were faced, or is it an invention. Only if it's an invention can you have a patent.

PERHAPS the best definition of invention is this: somehow or other the knowledge accumulated to date doesn't solve the problem. It takes you up to a certain point but you're still stuck; you don't know how to lick the problem. Sometimes it's solved by careful plodding away, by the elimination of ways of not doing it. Such a method, however, doesn't meet the Supreme Court test because the Court once said that invention was a "flash of genius." Edison's testing of some 80 or 90 materials to make the electric light bulb filament certainly isn't a flash of genius. We're getting the Court broken down a little. Patent lawyers pretty nearly blew their tops when the Court said invention is a flash of genius and we've been working on the Justices ever since to change their minds. The new law that just went into effect says positively that the manner of arriving at the invention has nothing to do with whether or not it's an invention. It will be a little difficult for the Supreme Court now to say that Congress meant invention is a flash of genius because Congress has said that isn't true.

To solve this problem you do it in some manner different from the normal expected manner based on all the scientific knowledge to date. I'm not going to try to define it any further but the reader will get a little feeling for it as we go along.

(The *American Engineer* is pleased to present this three-part article by the well-known patent attorney, Mr. Henry K. Leonard. The second installment in the series will appear next month.—*Editor.*)



This New Salary Survey Is A Must For Your "Working" Library

Look below for the Table of Contents of this book. Note the wide range of up-to-date information that is contained in this *one* publication for your easy reference. Whether you are in industry, education, government, or consulting work, this should be near your desk. Order several copies today!

Limited First Printing . . . Order Now!

PRICES:

To Members: 50¢ per copy.
Non-Members: $1.00 per copy.
Prices for bulk copies quoted on request.

The 1952 Salary and Income Survey Provides the Answers on These Points:

- Geographic Distribution
- When Did They Enter The Profession
- For Whom Did They Work
- In What Branch of Engineering Did They Work
- What Kind of Work Did They Do
- How Much Did They Earn
- Overall Earnings
- Earnings by Years of Experience
- Earnings by Branch of Engineering
- Earnings by Field of Employment
- Earnings According To Type of Work Performed
- Earnings According to Grades
- Regional Variations

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
1121 Fifteenth Street, N.W., Washington 5, D. C.

Please send me ..... copies of the new Income and Salary Survey at ..... per copy.

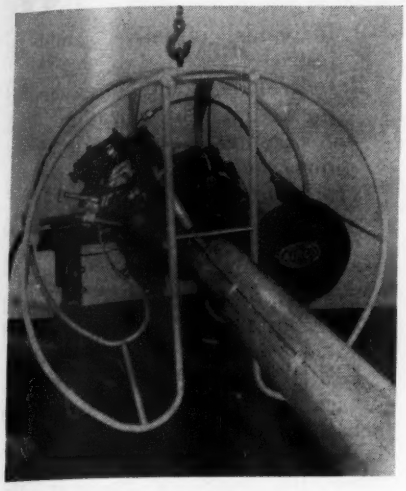
I enclose (....money order) (....check) in the amount of $.....

NAME .....

STREET .....

CITY ..... **STATE** .....

- - NEW PROCESSES - -



Experimental model of Airco aluminum pipe welding machine.

Aluminum Pipe Welding Machine

Air Reduction recently demonstrated an experimental model of a special aluminum pipe welding machine which was developed in cooperation with the Reynolds Metal Company, Engineering Department. The machine is designed for the field welding of aluminum gas gathering lines and oil transmission lines. The unit employs the Aircomatic Welding Process, a fast method of obtaining sound, dependable welds in aluminum. A consumable 43S aluminum wire is fed by guide rollers from a reel to the welding nozzle. At this point, the wire, weld and base metal are protected from oxidation by a shield of inert-gas (argon, helium or a mixture of the two). A wind shield around the nozzle insures complete gas shield for welding out-of-doors.

The welding machine is constructed of cast aluminum, weighs approximately 200 pounds and measures 4 feet in diameter by 2½ feet in width. A lifting eye is provided for raising and lowering the unit over the work. Once the machine is clamped to the pipe the welding gun circles it by means of a motor driven worm gear. Adjustments are provided to accommodate 4″, 6″ and 8″ O. D. piping with wall thicknesses of ⅛″ to ¼″.

One push button simultaneously starts shielding gas flow, wire feed, circumferential movement of machine and arc. At the completion of the weld the machine stops automatically. A weld on 6″ O. D. aluminum piping is made in 17 seconds.

Air Reduction Corp., 60 East 42nd Street, New York 17, N. Y.

Insulation For LP-Gas Storage Tanks

Propane and butane storage tanks above ground can now be effectively insulated against fire as the result of a new development of the Refractories Division of The Babcock & Wilcox Company, according to J. E. Brinckerhoff, general manager of the Division.

The material used for insulation is known as B&W K-20 Concrete Mix, previously used with success in various parts of industrial heating furnaces subjected to 2000 F. temperatures.

Serious fires in recent years, involving storage tanks for liquefied petroleum gas (LP-Gas), have stimulated interest in the new development among fire insurance companies, state regulatory bodies, refineries, and users.

The fireproofing material is a lightweight insulating concrete consisting of a kaolin base and hydraulic setting cement binder. It is applied with a cement gun to a thickness of 1½ inch on the outside of the tank, and is supported by steel banding straps fastened against the tank casing by band tighteners. To these straps are fastened bent clips which, in turn, anchor the K-20 Concrete Mix and serve as a spacer for a two-inch galvanized steel wire mesh reinforcement. For adequate anchorage, the straps are located two feet apart, and the clips every 12 inches along the straps.

Previous to application of the K-20, the tank shell is covered with a corrosion resistant paint. Because of the refrigeration effect produced in some types of tanks by the conversion of liquid to gas when the tank is being discharged, it is possible for water vapor in the atmosphere to condense on the outer surface of the tank. If the tank is insulated, water and ice may form under the insulation and cause oxidation of the shell. The application of the corrosive resistant paint prevents such a development.

After the concrete has thoroughly dried, the outer layer of the insulation is sprayed with a weatherproof coating of a type which provides a good water-vapor seal.

For the past year the Refractories Division of The Babcock & Wilcox Company and the Factory Mutual Engineering Division of Boston have worked on laboratory tests for this new development, resulting in its acceptance by the Factory Mutual Laboratories.

New Development In Aluminum

A new development in aluminum may well be adaptable to processing by engineers, designers, architects and contractors. The product is Reynolds Home Aluminum—strong, yet soft enough that any tool, hand or power, ordinarily used with wood may be applied to Home Aluminum without damage to the tool. The material is being made available by Reynolds Metals Company, 2500 So. Third Street, Louisville, Ky., for years a producer of strong aluminum alloys for industrial use.

Home Aluminum comes in these shapes and finishes: Sheet (embossed or plain), foil, rod, bar, tubing and angle, plus a variety of aluminum rivets, bolts and other fasteners.

Reynolds set up a complete home workshop at its General Sales Office in Louisville, and has for more than a year been testing Home Aluminum. The product also has been tested and approved by leading manufacturers of hand and power tools. The company has on display an attractive array of items, ranging from simple auto oil-drip pans for the garage to more involved nesting tables, demonstrating the versatility of Home Aluminum.

Disbelieving at first that a metal could be safely used on tools heretofore reserved for materials in the wood category, workshoppers testing the metal report that they have little or no difficulty in sawing, planing, or drilling Home Aluminum with ordinary woodworking tools. A standard jointer-planer was used with the product for many months in the Reynolds workshop with no apparent dulling or damage to its sensitive blade. The company emphasizes, however, that other types of aluminum are harder, and may damage such sensitive tools.

"The development of Home Aluminum brings a new era to the already fast-growing do-it-yourself market," points out C. F. Manning, vice president, Reynolds Metals Co. He says, "It will be a great help in the countless jobs of maintenance and improvement on home and farm."

In addition to use for maintenance and improvement, engineers, designers, architects, and contractors may find that this new development fits their specifications in a variety of problems where a light, strong, yet soft, metal is needed.

N.S.P.E. Believes

PROFESSIONAL STATURE— NOT VIA COLLECTIVE BARGAINING

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

A topic in which there is a great deal of interest throughout the country at the present time is the matter of collective bargaining for professional engineers. It is a subject which can be treated only briefly in this page. It is not a new subject; for older members of NSPE will note, in their back issues of the AMERICAN ENGINEER, articles and discussions on this topic dating almost from the founding of the Society. In other engineering groups, the discussions have been of even longer duration.

Why, then, this widespread concern throughout the profession at this time? One of the reasons has been the emergence of the Engineers and Scientists of America, a national federation of independent, National Labor Relations Board-certified organization of professional employees. The ESA claims to represent between 25,000 and 40,000 professional employees. The number of registered professional engineers in this group, however, is believed to be comparatively small.

A second reason is the recently-published resolution adopted by the New York State Federation of Labor's Annual Convention, as follows:

> "*Resolved*: That the 1953 New York State Federation of Labor Convention urge all its affiliated local unions and labor councils to cooperate in helping organize the technical, engineering, surveying and architectural employees in all industries, . . . and be it further *Resolved* that . . . contacts be made with unorganized technical, engineering, surveying, bacteriological, and architectural key men in offices, plants, shops and job sites through such other unions or councils which have collective bargaining agreements in these respective places. . . ."

The NSPE for some time has had a policy, first enunciated by the Board of Directors in September, 1948: "The individual responsibility and independent judgment required of a professional engineer are incompatible with the regimentation fundamentally inherent in unionization."

There are many reasons why the long-range objectives of professional status and advanced personal prestige support this point of view. Recognizing that individual development is the keystone of professional progress and standing, Dean Willis Woolrich of the University of Texas summarized recently in the AMERICAN ENGINEER why professional groups oppose unionization of engineers. He wrote:

1. Individual initiative would be restricted.
2. Individuals would be regimented by the union organization.
3. A "typing" of engineering positions and a "leveling" of salaries would result.
4. Professional status and prestige of engineers would be damaged, if not lost entirely.
5. Individual advancement and recognition of individual achievements would be stifled.

NSPE believes that a positive approach to this problem is essential on behalf of professional engineers. Before the problem can be properly analyzed for solutions, however, the causes must be determined. The Third Executive Research Survey of NSPE's Professional Engineers Conference Board for Industry is, therefore, securing answers to a number of perplexing problems bearing on the employment and retention of professional engineers.

Individual development and professional status can thrive only in a healthy environment created by the users of engineering services. Recognizing this, a major phase of NSPE's public relations program is devoted to this effort.

Continuous information regarding the economic status of the profession must be available so that members of the profession will be informed of their relationship individually to the total engineering employment picture. NSPE's recent salary survey (which it is expected will be repeated periodically) is a step in this direction.

Recognizing that engineers must be able to discuss their problems freely with all levels of engineering employment, NSPE has sponsored the introduction of amendments to the Taft-Hartley Act permitting freedom of association, which would allow groups within industries to resolve problems without resorting to collective bargaining.

Certainly, the Professional Society should be concerned with the welfare of its members. This problem, however, is not one which can be left for others. It is a problem which has far-reaching implications throughout the profession, whether or not the specific collective bargaining activity affects the individual member. It is, therefore, timely that there should be both the type of discussion and concern for this problem which exists throughout the profession, and the aggressive efforts of this and other societies to determine the real nature of the situation and take steps toward its long-range solution.—***End.***

With Our Members . . .

New York News

State Society Schedules Autumn Meeting; Selects Bear Mountain Inn for Event

The autumn board of directors meeting of the New York State Society of Professional Engineers will be held October 2 and 3 at Bear Mountain Inn on the Hudson River. The event is expected to attract not only officers and directors of the State society and official chapter delegates, but also many others including representatives of the New York State Education Department and presidents and deans of various engineering colleges.

Highlight of the meeting will be the October 2 testimonial dinner in honor of Dr. David B. Steinman, NSPE's first president and a founder and past president of the New York State SPE. The dinner is being given in recognition of the eminent bridge-builder's twenty-four years of service as a member of the New York State Board of Examiners of Professional Engineers and Land Surveyors.

A ladies' program has also been planned. And tours of West Point Military Academy or the Early American Village at Smith's Cove will also be open to those in attendance.

Arrangements for the meeting have been made by Rockland County Chapter members who are acting as hosts under the chairmanship of B. G. Le Mieux.

Varied Program Schedule For Tidewater P.E.'s

W. B. Blanchard, president of the Tidewater Chapter, Virginia Society of Professional Engineers, has outlined a meeting schedule that will include many social get-togethers as well as regular business sessions. President Blanchard also reports that membership interest in professional activities has been greatly stimulated by following a policy of general study and discussion of committee reports as they are presented at the beginning of each business meeting.

D. C. Society Holds Dinner Meeting

The first event of the 1953-54 season for the members of the District of Columbia Society of Professional Engineers was a dinner meeting held at Bonat's Restaurant on September 28. President C. Warren Bogan presided at the meeting, during which members discussed many important items of Society business.

Smog Panel Sponsored By Pasadena Chapter

Four of California's top air pollution experts took part, September 24, in a public panel discussion of the smog problem, which was sponsored by the Pasadena Chapter, California SPE. The participants in the forum, which was held at the Pasadena Elks Lodge, were Gordon Larson, director of the Los Angeles County Air Pollution Control District; Dr. Arie Haagen-Smit, noted California Tech chemist; Dr. A. M. Zarem, manager of the Stanford Research Institute; and Clarence A. Winder, mayor of Pasadena and a consulting engineer. John H. Rice, executive secretary of the Citizens Committee on Air Pollution, acted as moderator.

Joint Meeting Planned In Arizona

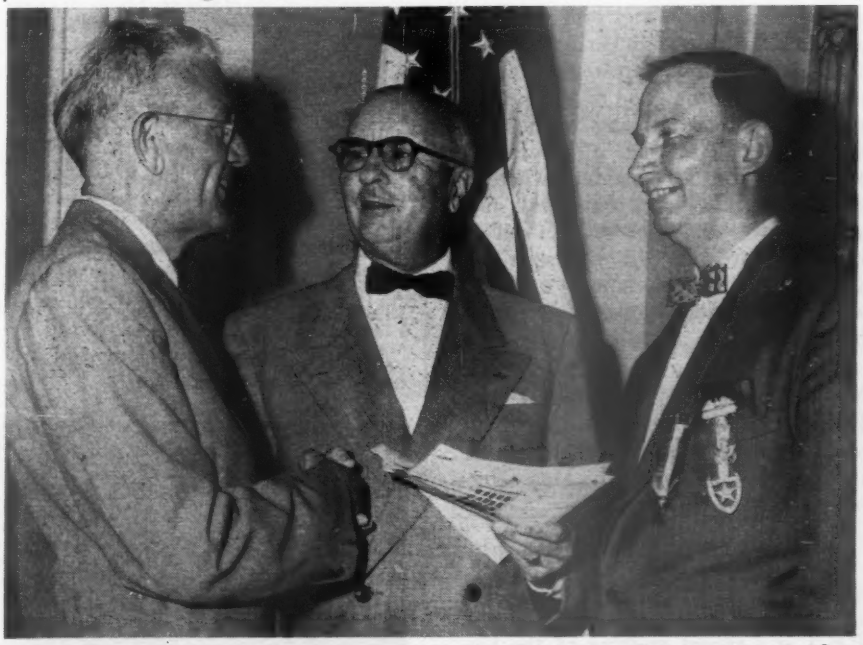
Walter Burg and Carl Huskison, acting as co-chairmen of the Arizona SPE Annual Joint Meeting Committee, are completing plans for this year's event to be held in conjunction with other engineering societies at the Hotel Westward Ho in Phoenix on November 6. Other members of the committee in charge of arrangements for the meeting are Reamy C. Fitch, Walter Biddle, Harry Bigglestone, and Hanen Williams.

Lorain County, Ohio, Refresher Course

As a service to local engineers and recent engineering school graduates, the Lorain County Chapter of the Ohio SPE is sponsoring a refresher course to aid applicants in preparing for the state license examination. The course, which began September 28 at the Elyria, O., High School, has been organized by an experienced teaching staff and is scheduled to run for six weeks.

Members of the chapter also recently saw a sound and color movie, *Corrosion in Action*, and heard a corollary discussion of the subject led by E. W. P. Smith, metallurgist with Bendix-Westinghouse Automotive Air Brake Company.

Congratulations for Ritchie Lawrie, Jr.



Dale H. Learn, Stroudsburg, Pa., real estate broker and state vice president of the Patriotic Order Sons of America, is pictured here congratulating Ritchie Lawrie, Jr., on his receipt of the organization's Award and Certificate of Merit. Mr. Lawrie, a member of the Pennsylvania SPE, is a past president of NSPE. Looking on as Mr. Learn congratulates Engineer Lawrie is Harvey E. Stoehr who, as state president of the P. O. S. of A., conducted the presentation ceremony. Mr. Stoehr, now state secretary of the patriotic organization, is also a member of the PSPE.

Dr. Karl B. McEachron

Dr. McEachron To Address Maryland Meeting

Dr. Karl B. McEachron of the General Electric Company, a prominent engineer and authority on employee relations and professional unity problems, is scheduled to address the members of the Maryland SPE at their October 13 meeting at Baltimore's Park Plaza Hotel.

Dr. McEachron, who has recently been appointed consultant on professional employee relations in G-E's Employee and Community Relations Department, is expected to discuss registration, unity, and other related problems of the engineering profession. He has often expressed the opinion that: "For the good of the profession as a whole, it seems to me that the time is here when all engineers should seriously consider whether they should become registered, not only for the value they can get out of it personally, but also to assist the standing of the profession as a whole, and this very action itself is a part of being professional."

Dr. McEachron is a member of the Massachusetts Society of Professional Engineers as well as other professional and scientific organizations, and he is a former member of the Massachusetts Board of Registration.

NEW P.E.'s—NSPE Vice President N. W. Dougherty presented engineering license certificates to six new P.E.'s at a recent meeting of the Upper East Tennessee Chapter, TSPE. In the photo, l. to r., are: Garry W. Howell, E. C. Blackard, Donald V. Ross, Paul F. Flamm, Dean Dougherty, John R. O'Neill, and T. F. Reid. Dean Dougherty is chairman of the Tennessee Board of Architectural and Engineering Examiners.

Northeast Pa. Chapter Hears Ventilating Talk

W. D. Meakin, ventilating engineer for the Joy Manufacturing Company and a chemical engineering graduate of Purdue University, was the featured speaker at the September 18 meeting of the Northeast Chapter, PSPE, held at the Hotel Sterling in Wilkes-Barre. Mr. Meakin's subject was *Planning the Ventilation of a Coal Mine.*

Don N. Smith is chairman of the program committee which arranged the event, while W. H. Lewis is chapter president.

Complementary lectures on the *Industrial Use of Paint* are scheduled for the chapter's October meeting.

Iron Works Tour For Massachusetts Group

Members of the North Shore Chapter, Massachusetts Society of Professional Engineers, made their September 24 meeting a four-star event by combining ladies' night, a dinner meeting, a tour of America's first iron works in Saugus, Mass., and a program featuring J. Sanger Attwill, president of the First Iron Works Association, as speaker.

C. B. Fontaine of Swampscott, Mass., is president of the chapter.

Oriental Movies Shown In Frisco

Two technicolor movies — *The Philippines Today* and *Calcutta*— both supplied by the Philippine Air Lines, were shown following the September 16 dinner-meeting of the Golden Gate Chapter, CSPE.

The meeting, which was held in the Mural Room of the San Francisco Brewing Corporation, was in charge of Program Chairman Sherwin Wright, assisted by John Churchill.

Arthur C. Bullen is president of the chapter.

Successful Meeting In North Carolina

Reports of a most successful summer convention have been received from the Professional Engineers of North Carolina. NSPE President T. Carr Forrest, Jr., was the honored guest and featured speaker at the three-day meeting, which was held at the Sedgefield Inn, Greensboro, N. C., late in August.

In addition to delivering the main address at the convention banquet, Mr. Forrest also acted as moderator during a symposium discussion of problems confronting young engineers. George S. Rawlins, president of the North Carolina group, presided at the symposium, while Dr. Karl B. McEachron and C. W. Ransom of General Electric Co., G. E. Morse of Minneapolis-Honeywell, and Dean N. W. Dougherty of the University of Tennessee spoke on various aspects of the subject under discussion.

Earle C. Hubbard was chairman of the program committee, assisted by Nat D. Peirson and Robert B. Rice. Local arrangements were handled by a committee composed of John D. Watson, chairman, William D. Graham, Jr., R. K. Hunter, and E. G. Singletary.

A special program was also provided for the ladies in attendance. Mrs. John E. Hart was chairman of the committee in charge of this, assisted by Mrs. J. Dann McConnell, Mrs. Harry Hoffman, and Mrs. J. DeB. Shepard.

Travis Chapter Meets

Members of the Travis Chapter, Texas SPE, held a dinner meeting September 10 at the Pioneer Restaurant in Austin. Following the dinner, a business session was held at which a number of matters of chapter interest, including Engineers' Week plans, were discussed.

. . . more news on page 36

Professional Directory

Alphabetically Arranged by States . . . *Alabama - Nebraska*

A. W. WILLIAMS INSPECTION CO.
Mobile, Ala.

Inspections—Tests—Analyses
Sampling
Foundation Investigations

Representatives throughout U.S.A.

C. M. HATHAWAY
Consulting Engineer

Electrical—Mechanical—Electronic
Product Development—Project Engineering
Production Designs—Planning
Research—Model Work and Pilot Manufacturing

1315 S. Clarkson St. **Denver 10, Colo.**

F. A. SANDO
Consulting Engineer

Steam Power & Boiler Plants
Incineration Plants

429 E. 14th Ave. **Denver 3, Colo.**

FRED S. DUBIN ASSOCIATES
CONSULTING ENGINEERS

Plans, Specifications, Surveys, Reports
Heating, Air Conditioning, Electrical, Plant Layout, Piping, Boiler Plants, Incinerators, Water Supply, Sewage Disposal, Industrial Ovens

1092 Farmington Ave.
West Hartford, Conn.
Registered New York, Conn., Mass., Fla.

Mechanical — Management — Electronic
Process — Design — Quality Control
Investigations — Appraisals — Reports

JOHN I. THOMPSON & COMPANY
ENGINEERS

921—17th St., N.W., Washington 6, D. C.
Laboratory Division: Bellefonte, Pa.

G. A. JAMES & ASSOCIATE ENGINEERS, INC.

Civil—Structural—Municipal—Sanitary
Airports, Highways, Grade Separation, Turnpikes, Traffic, Sewerage and Sewage Disposal, Water Supply and Distribution.

220 Miracle Mile **Coral Gables 34, Florida**
Phone 48-6394

JOHN W. PENNEL
CIVIL AND CONSULTING ENGINEER

Howell Building

202 E. Fourth St. **Panama City, Fla.**

SOUTH FLORIDA TEST SERVICE

Testing—Inspection—Research—Engineers

Consultants and specialists in corrosion, weathering and sunlight testing.

4201 N.W. 7th Street **Miami 34, Florida**

LAW—BARROW—AGEE LABORATORIES, INC.

Foundation
Investigations

Physical & Chemical Testing

Main Laboratories: Atlanta, Ga.
Charlotte, N. C., Albany, Ga., Tampa, Fla.

ROBERT AND COMPANY ASSOCIATES
Consulting and Designing Engineers

Industrial Plants—Municipal, Highway and Airport Improvements — Power Plants — Water Supply — Sewage and Industrial Waste Disposal — Appraisals — Reports.

Atlanta **Georgia**

CONSOER, TOWNSEND and ASSOCIATES

Water Supply, Sewerage, Flood Control and Drainage, Bridges, Express Highways, Paving, Power Plant, Appraisals, Reports, Traffic Studies, Airports Gas & Electric Transmission Lines

351 E. Ohio St., Chicago 11, Illinois
9½ N. Indiana St., Greencastle, Ind.

CRESCENT ENGINEERING COMPANY, INC.

Contracting & Consulting Electrical Engineers

Design, Supervision and Construction
Process Power and Lighting for Industrial Plants

6455 S. Central Avenue, Chicago 38, Illinois

DeLEUW, CATHER & COMPANY
Consulting Engineers

Transportation, Public Transit and Traffic Problems

Industrial Plants, Grade Separations, Railroads, Subways, Power Plants, Expressways, Tunnels, Municipal Works

150 N. Wacker Drive **Chicago 6**
79 McAllister St. **San Francisco 2**

WILSON & COMPANY
ENGINEERS

Salina, Kansas
Albuquerque, New Mexico
Denver, Colorado

EUSTIS ENGINEERING COMPANY

FOUNDATION AND SOIL MECHANICS INVESTIGATIONS
Soil Borings—Laboratory Tests
Foundation Analyses—Reports

3635 Airline Highway
New Orleans 20, La.

FAY, SPOFFORD & THORNDIKE
Engineers

Charles M. Spofford — Ralph W. Horne
John Ayer — William L. Hyland
Bion A. Bowman — Frank L. Lincoln
Carroll A. Farwell — Howard J. Williams

Airports, Bridges, Turnpikes
Water Supply, Sewerage, Drainage
Port and Terminal Works
Industrial Buildings

BOSTON **NEW YORK**

COMMONWEALTH ASSOCIATES INC.
Consulting and Design Engineers

Power Generation
Electric—Gas—Water Systems
Industrial Planning

252 W. Cortland St. **Jackson, Michigan**

THE HINCHMAN CORPORATION
CONSULTING ENGINEERS

CORROSION CONTROL—Surveys, Reports, Design, Specifications, Evaluation

UNDERGROUND UTILITIES — Location, Mapping, leakage surveys, electrical grounding systems

HOLLOW PILING—Directional Surveys by electronics

Francis Palms Building **Detroit 1, Mich.**

R. S. HOUGE
Registered Professional Engineer

Drainage, Bridge,
and Utilities Construction

1145 South Florence Avenue
Springfield 4, Missouri
Telephone 4-6540

HAROLD H. WHITE
Consulting Engineers

INDUSTRIAL SEISMOLOGY
BLASTING VIBRATION RECORDING
Expert Testimony

1831 Picher Ave. **Joplin, Missouri**

BACKLUND and JACKSON, INC.
Consulting Engineers

Architectural, Civil,
Municipal, Structural.

4924 Poppleton Avenue
Omaha 6, Nebraska

Directory Continued on Next Page . . .

Professional Directory

Alphabetically Arranged by States . . . *. . . New Jersey - New York*

ENGINEERING DRAFTING SERVICE
S. J. Ozimek—Consulting Engineer
Industrial Bldgs.—Mechanical—Structural—Electrical—Piping—Tools—Machine Design—Product Design—Electronics
38 Park Pl., Newark 2, N. J.

GREER & McCLELLAND
Consulting Engineers
FOUNDATION INVESTIGATIONS
98 Greenwood Ave. **Montclair, N. J.**
2649 N. Main St. **Houston, Texas**

FRANK E. HARLEY AND ASSOCIATES
Water Works, Sewage, Municipal Highways
Harley Building
260 Godwin Avenue **Wyckoff, N. J.**

PROCESS DESIGNS, INC.
L. R. Hill, President
Consulting and Developing
Oil Refining and Related Organics
45 North Broad Street, Ridgewood, N. J
Ridgewood 6-0195

W. W. SLOCUM & CO.
Engineers
Industrial Engineering
Complete Project Design
Management Engineering
National Newark Building
744 Broad St. **Newark, N. J**

UNITED STATES TESTING COMPANY, INC.
Engineering Testing & Inspection
Development — Research — Consulting
Main Laboratories **Hoboken, N. J**
Boston, Chicago, Dallas, Los Angeles, Memphis, New York, Philadelphia

ALLAN T. HOLLOWAY & ASSOCIATES
Reports—Appraisals—Surveys
Special Technical Studies—Consulting
1015 La Font Place, S.W., Albuquerque, New Mexico

BROWN & BLAUVELT
Industrial Plants, Bridges, Dams, Airports, Expressways, Parkways, Highways, Preliminary Reports, Engineering Design, Construction Supervision, Material Control and Testing, Municipal Engineering Services, Tax Maps, Surveying
468 Fourth Avenue **New York 16, N. Y.**

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers
Bridges and Structures
Foundations, Highways
Administrative Services
1805 Grand Ave. **Kansas City 8, Mo.**
55 Liberty Stree **New York 5, N. Y.**

. . . Restricted to Registered Professional Engineers

California Lectures

At the season's opening meeting of the Peninsula Chapter, California SPE, members and guests in attendance heard R. W. Smith of the Stanford Research Institute speak on *Engineering Economics.* The senior market analyst is a well-known authority on the economic significance of technological trends.

A lecture was also the feature attraction for the September meeting of California's East Bay Chapter. In the latter case, the featured speaker was Dr. Joseph A. Pask of the College of Engineering, University of California. His topic was *What is Ceramic Engineering?*

Past Presidents Night For Lehigh Valley P.E.'s

Past presidents of the Lehigh Valley Chapter, PSPE, were honored at the September 18 dinner-meeting at the Penn Stroud Hotel, Stroudsburg, Pa. In lieu of a speaker, the members in attendance were treated to a trip through the Patterson Kelley Company Plant, where they observed second shift workers engaged in manufacturing heat exchangers, hot water heaters, and other equipment for the chemical, air conditioning, and pharmaceutical industries.

Flood Lecture For Topeka P.E.'s

At their September 16 meeting at the Jayhawk Hotel, members of the Topeka, Kansas, SPE heard Dwight Payton give an address entitled *From Flood to Drouth.* Mr. Payton, the editor of the *Overbrook Citizen* and the *Scranton Gazette,* is president of the Kansas Watersheds Association, which he helped to organize, and a well known authority on water resources.

Film Showing At Kansas Meeting

A movie on coaxial and microwave transmission was shown as a program feature of a recent dinner meeting of the Eastern Chapter, Kansas SPE. A. Campbell of the Bell Telephone Company described the two systems in conjunction with the showing.

The meeting was held at the Olathe Hotel, Olathe, Kan. Malcolm Steele is president of the group.

Power Plant Tour Set

Members of the Monmouth-Ocean Chapter, New Jersey SPE, have been invited to tour the E. H. Werner Generating Station of the Jersey Central Power & Light Company for their October meeting. The ladies' auxiliary will also take part in this tour, and a buffet supper will be served following the visit to the plant.

Blue Water Officers

Recently-elected officers of the Blue Water Chapter, Michigan SPE, for the 1953-54 administrative term, are John S. Reed, president; Fred A. Christ, vice president; Glen A. Whitmore, state director; Mark A. Chambers, secretary-treasurer; and Philip R. Bruce, recording secretary.

Crime Detection Talk In Springfield, Ohio

Chief Lawrence Abbott of the Springfield, Ohio, Police Department addressed Springfield P.E.'s at a recent meeting on the subject of *Scientific Crime Investigation.* The meeting was held at the Springfield YMCA on September 9.

. . . more news on page 38

Professional Directory

Alphabetically Arranged by States . . . *. . . New York - Pennsylvania*

KNAPPEN-TIPPETTS ABBETT-McCARTHY
Engineers

Ports, Harbors, Flood Control, Irrigation, Power, Dams, Bridges, Tunnels, Highways, Subways, Airports, Traffic, Foundations, Water Supply, Sewerage, Reports, Design, Supervision, Consultation.

62 West 47th Street — New York City

MADIGAN-HYLAND
Consulting Engineers
28-04 41st Avenue
Long Island City, New York

JAMES P. O'DONNELL
ENGINEERS

39 Broadway — New York 6, N. Y.
Bowie Building — Beaumont, Texas

PARSONS, BRINCKERHOFF, HALL & MACDONALD
Engineers
51 Broadway, New York 6, N. Y.

D. B. STEINMAN
Consulting Engineer
BRIDGES
Design — Construction — Investigation
Reports — Strengthening Advisory Service
117 Liberty Street — NEW YORK CITY

SYSKA & HENNESSY, INC.
Engineers
Design, Reports, Consultation
Power Plant, Disposal Plant, Water Systems
NEW YORK, N. Y.

Chicago — Cleveland — St. Louis

ADACHE & CASE, ENGINEERS
The Arcade, Cleveland 14, Ohio
Consulting • Design • Reports
• Mechanical • Electrical • Civil
• Industrial Buildings •

GEORGE W. BRANDT, ENGINEER
Consulting • Design •
Mechanical • Development • Fabrication
Box 101 — West Milton, Ohio

GUSTAVE M. GOLDSMITH
Consulting Engineer
General Structures — Plant Layout
Design—Investigation—Quantity Surveys
1734 Bella Vista — Cincinnati 37, Ohio

EMMET J. McDONALD
CIVIL ENGINEER
HIGHWAYS, MUNICIPAL, SURVEYS
326 S. Main St. — Akron 8, Ohio

TOLEDO TESTING LABORATORY
Engineers and Chemists
Concrete — Soils — Asphalt
Inspection — Tests — Supervision
Consultation — Specifications and Investigation of
Engineering Works and Materials
1810 North 12th St. — Toledo 2, Ohio

WARNER ENGINEERING CO.
Consultation—Design—Detail
Steel Mill and Heavy Industrial Construction
Mechanical—Structural—Piping
Broadway Building — Lorain, Ohio

OKLAHOMA TESTING LABORATORIES
Registered Engineers—Chemists
Oklahoma City, Okla.
Materials Testing and Inspection
Member A. C. C. L.
C. A. Lashbrook, Owner-Director — M. A. Witte, Chief Engineer

AUBURN & ASSOCIATES, INC.
Heavy Industrial Electrical, Foundation and Piping
Atomic Energy Work and Electrical Control Schemes
923 Penn Avenue — Pittsburgh 22, Pa.

CAPITOL ENGINEERING CORPORATION
Engineers—Constructors—Management
Design and Surveys — Roads and Streets
Sewer Systems — Water Works
Planning — Airports
Bridges — Turnpikes — Dams
Executive Offices: Dillsburg, Pennsylvania
Washington, D. C. — Pittsburgh, Pa.
Dallas, Texas — Paris, France

FRAZIER-SIMPLEX, INC.
CONTRACTING & CONSULTING ENGINEERS
Furnace Engineering for the Glass and Steel Industries
436 East Beau Street, WASHINGTON, PA. U. S. A.

GANNETT FLEMING CORDDRY & CARPENTER, INC.
Engineers
Water, Sewage, Roads, Turnpikes, Bridges, Airports, Traffic, Appraisals.
HARRISBURG, PA.
Philadelphia, Pa. — Daytona Beach, Fla.
Pittsburgh, Pa. — Medellin, Colombia, S. A.

ELLIS M. LANDIS
REGISTERED ENGINEER
Machine and Product Design and Development
Tool Design
Special and Automatic Machinery
Contemporary Redesign
226 S. 52nd St., Philadelphia 39, Pa.

LAWRIE & GREEN & ASSOCIATES
Architectural and Engineering Offices
321 N. Front Street
Harrisburg, Pennsylvania
Ritchie Lawrie, Jr., P.E., Consulting Engineer

LOEDDING ENGINEERING CO., INC.
Consulting, Design and Detail
Industrial and Commercial Planning
Bridges, Structures of all Types
Material Handling
Conveyors, Gantry, Overhead and Jib Cranes
Reinforced Concrete and Foundations
Industrial Piping and Ventilation
Economy Bank Building, Ambridge, Penna.

MODJESKI AND MASTERS
Consulting Engineers
G. H. Randall — F. M. Masters — J. R. Glase
C. W. Hanson — H. J. Engel
Design and Supervision of Construction
Inspection and Reports
Bridges, Structures and Foundations
State St. Bldg. — New Orleans, La.
Harrisburg, Pa. — Philadelphia, Pa.

Directory Continued on Next Page . . .

Professional Directory

Alphabetically Arranged by States . . Pennsylvania - W. Va.

CYRUS WM. RICE & CO., INC.

Consulting Chemical Engineers
Industrial Water and Waste

16 Noble Avenue, Pittsburgh 5, Penna.

EMERSON VENABLE

Chemist and Chemical Engineer

Chemical Analysis
Research — Development
Trouble Shooting

6111 Fifth Ave., Pittsburgh 32, Pa.

YOKLEY and WAGGONER

Consulting Engineers

Airports, Roads, Sewerage, Structures, Soil Mechanics, Design, Supervision, Surveys

1123 Church Street Nashville 3, Tennessee

CORMIT ENGINEERING COMPANY
Marshall E. Parker, P.E.

CORROSION — CATHODIC PROTECTION
Surveys, Reports, Design, Specifications
Coating Inspection
UNDERGROUND PIPING, WATER TANKS, OFFSHORE PLATFORMS, BARGES, PILING

M & M Building
No. 1 Main Street, Houston 2, Texas
Telephone FAirfax 9953

THOMAS E. DUCE ASSOCIATES

Consulting Engineers

Electrical and Mechanical

Murray Building
1733 S. Brownlee Blvd., Corpus Christi, Tex.

ENGINEERS TESTING LABORATORY, INC.

FOUNDATION AND SOIL MECHANICS INVESTIGATIONS

Soil Borings Laboratory Tests
Foundation Analyses Reports

3313 Main Street Houston, Texas

FORREST and COTTON
CONSULTING ENGINEERS

Regional Water Supplies
Water and Sewage Works
Industrial Development
Airports — Dams
Appraisals — Reports

803 Praetorian Building Dallas 1, Texas

Consult These Specialists . . . All Registered Engineers

JOHN W. MEDLIN

Consulting Engineer

Design of special machinery, materials handling systems, piping. Plant Layout.

4116 Yoakum Houston 6, Texas

ROBERT C. LAFFERTY

Consulting Geologist and Engineer
OIL and GAS

Appraisals, Exploration, Development, Management

Union Building Phones 6-4242
Charleston, W. Va. 5-2461

. . . Supplemental Services . . .

EHRCO DIE CASTING SERVICE

Engineering Consultation—Die Castings
Equipment—Installation
Die and Product Design

John R. Ehrbar, P.E., Pres.
303 Main Street, Stamford, Connecticut
Telephone 3-2308

EASTERN HEAT TREATING & BRAZING CORP.

Joseph Lipset, P.E., Pres.

Manufacturers of Metallic Bellows Assemblies

Precision Heat Treatment and Brazing of Metal Parts

Hydrogen Atmospheric Cycles

250 West 54 Street, New York 19, N. Y.

POTTEIGER COMPANY INC.

Builders for Engineers

328 Tulpehocken Ave., West Reading, Pa.

MOUNTAIN STATE FABRICATING CO.

D. F. Davis, P.E.
John Faron, P.E.
Lewis H. Helm, P.E.
C. A. Rider, P.E.

Machine Design, Pilot Models, Specialized Machinery and Fabrication

Milford St. Extension, Clarksburg, W. Va.

Hawaii Lecture In Pa.

The Midwestern Chapter, Pennsylvania SPE, has scheduled its October 3 meeting for the Penn Grove Hotel in Grove City. An illustrated lecture on Hawaii will be the main feature.

CLASSIFIED ADVERTISING

Minimum 3 lines.

Undisplayed: $1.50 per line.

Displayed: Same rate as General Advertising.

Positions Wanted: Undisplayed, 75c per line. Displayed, 50% off General Advertising Rates.

Box Number chargeable as one line.

Mail Box Number replies to:

AMERICAN ENGINEER
1121 15th St., N.W.
Washington 5, D. C.

Help Wanted

PROJECT ENGR. Work involves highly diversified design including plant layout, all phases of constr. including elec. equipment, process equipment, specs and calculating. Good opportunity for advancement. $6,000 to start. List your qualifications. Write Box 903, AMERICAN ENGINEER.

INDUSTRIAL OR MECHANICAL ENGINEER. Min. 2 yrs. machine design or devel. experience with interest in hydraulic design. $350 to $700 depending on exp. Box 101, AMERICAN ENGINEER.

MECHANICAL ENGINEERS—Junior, Intermediate and Senior. Openings in both product design and stress analysis. Salaries open. Cleveland. Write Box 102, AMERICAN ENGINEER.

DRAFTSMEN—3 to 5 yrs. exp. structural detailing and checking. Excellent opp. for advancement to design of radio and television towers and elec. substations. 7 to 10 yrs. program. $5,900. 48 hr. week. Box 104, AMERICAN ENGINEER.

Positions Wanted

KEY POSITION OR BUSINESS OPPORTUNITY WANTED

ELECTRICAL GRADUATE. Registered. Twenty-eight years experience as follows: Layout, equipment purchase, supervision installation 13.2 K.V. sub-sta. A.C. & D.C. motors & starting equipment to 500 H.P. General elec. & mech. engineering in steel mill & metal products plant. Supervision design, construction, operation, testing & maintenance elec., gas & oil steel mill & heat treating furnaces and companion equipment. Knowledge heat treatment of metals. Plant layout. Plant facilities procurement, installation & maintenance. Process engineering.
Experience & character references furnished. Employed. Available 30 days notice. Philadelphia, Pa. area. Box 10-B-1, AMERICAN ENGINEER.

Connecticut Officers

Officers for the 1953-54 administrative year have been elected by the Connecticut SPE as follows: Philip W. Genovese, president; Edward J. Nesbitt, first vice president; A. B. Onderdonk, second vice president; Joseph H. Roberts, secretary; Edwin S. Osteyee, treasurer; and Henry A. Pfisterer, national director.

The Society has also announced that Llewelyn M. Reed, past state president, has been named permanent executive secretary as a result of the group's expansion program.

Mr. Genovese, the current president, is a partner in the consulting and design engineering firm of Newman E. Argraves and Associates of New Haven. A graduate of Yale University, he has also been president of the New Haven chapter.

Letters

(Continued from page 5)

leges in normal numbers. During the recent major war we alone of the nations fighting that war conscripted scientific students who were doing acceptable work in school. We are now falling even more behind our needs because of existing unrealistic attitudes on the part of our selective service system, which appears to be anything but selective.

A student may be excused from service until he has completed his course of study as long as he remains in certain upper percentages of his class in a recognized college. All students compete on the same basis, however, without regard for the course of study undertaken. As the scientific courses, such as any one in engineering, are more difficult than others, these upper percentages are more difficult for students of such courses to maintain. As a result many students avoid such courses. Others are lost as students because those in less difficult studies maintain higher averages.

After graduation, an engineer has no particular protection from selective service, or rather the industry employing him has none. Our army complains of shortages of needed items and of retarded production schedules. Much of the difficulty of which they complain is due to interference with industrial organizations by our selective service through conscription of technical personnel. In our present military organization we have able engineers, badly needed by industry serving the rearmament effort, who are employed as military police, as equipment operators, as cryptographers or in any one of a number of functions which represent a great waste of valuable talent.

It appears to me that the selective service function should be truly selective. Each individual should serve our efforts to his best ability. A man with specialized abilities should be available to the military if the military needs and will use those abilities. Further, decisions regarding the proper employment of those with technical education and abilities should be made by those who understand the problems of production and the employment of such people, and not by the military establishment.

Service for the sake of service is pointless. If democracy becomes absolute, it will, like all absolutes in history, destroy itself with inflexibility. If all people had the same abilities, and all possessed the same knowledge, then service for all would make sense. Until this happy condition exists, however, complete democracy cannot exist. Attempts at complete democracy will but destroy us.

GEO. C. BARNES, JR., P.E.,
Virginia Polytechnic Institute,
Blacksburg, Va.

WOULD YOU LIKE TO MEET AN ENGINEER-MAYOR?

You can next month through the pages of the
AMERICAN ENGINEER

Don't Miss:

The Engineer in Public Life
BY RAYMOND R. TUCKER
Mayor of St. Louis

Business Opportunities **Business Opportunities**

2 BUSINESS PROPOSITIONS:

1. We want to purchase a Sand and Gravel Washing Plant, new or used.

2. We want to arrange a long-term agreement with a Ready Mix Concrete concern.

Proposition No. 1:

The sand and gravel crushing and washing plant should have two crushers to produce from 600 to 800 tons per day.

We have a gravel deposit of 23 acres which we own and we option small pieces adjoining our deposit of about a like amount. The top surface is 70% stone, 30% sand. Thompson & Lichtner Co., Inc., consulting engineers of Brookline, Mass. made a thorough study and survey of the deposit and samples taken by them from the property have passed a very high test. *Their complete report is available.* The R. E. Chapman & Co., well-water specialists, have taken tests and borings and assure us of 800 gallons per minute available water.

Proposition No. 2:

We're interested in a mutually profitable agreement on the washing and crushing and selling of the material at our property on Route 85 in Southboro, three miles from Framingham, Mass.

We want to secure some Ready Mix Concrete Concern to place the necessary machinery on our property —(we have a Railroad siding leased one mile from the deposit) and we will sell the aggregate to the Ready Mix Concern on a long term basis similar to other satisfactory agreements between several firms in the immediate area.

All zoning laws and necessary permits have been complied with.

We enter our pit from a main State Highway 65 feet wide.

Boston is less than twenty miles over a new Super Highway which passes within 400 yards of our deposit. A twenty-mile radius would cover Boston, Worcester, Newtonville, Waltham and Franklin.

For more details, call or write:

FRAMINGHAM SAND & GRAVEL CO., INC.

83 Concord Street **Framingham, Mass.**

FRamingham 2-1294

Member State Societies' Officers and Directors

Alabama

Pres., H. K. Weaver, 504 Watts Bldg., Birmingham, Ala.
Sec., F. J. Dupuis, c/o Univ. of Ala., 2131 6th Ave., N.
Nat. Dir., Leonard W. Peterson, 812 Fifth Ave., N., Birmingham, Ala.

Arizona

Pres., Benjamin McLain, 118 W. Washington St., Tucson, Ariz.
Sec. Treas., John H. Stufflebean, 155 W. Pennington, Tucson, Ariz.
Nat. Dir., W. A. Burg, 108 W. Elm Dr., Phoenix, Ariz.

Arkansas

Pres., Harold J. Engstrom, Jr., Arkansas Foundry Co., Little Rock, Ark.
Sec., Jack H. Wilson, 2508 N. Pierce St., Little Rock, Ark.
Nat. Dir., R. J. Rhinehart, 411 Main St., Pine Bluff, Ark.

California

Pres., C. D. Allen, 323 San Mateo Dr., San Mateo, Calif.
Ex. Sec., P. J. Speros, 681 Market St., San Francisco, Calif.
Nat. Dir., Oliver Deatsch, Rt. 6-1436, Modesto, Calif.

Colorado

Pres., Howard Lane, 8596 W. Colfax, Denver, Colo.
Sec., Kenneth R. White, 1340 Glenarm Place, Denver, Colo.
Nat. Dir., Sam H. Hawkins, 414—14th St., Denver, Colo.

Connecticut

Pres., P. K. Genovese, 70 College St., New Haven, Conn.
Sec., Joseph H. Roberts, Box 389, Milford, Conn.
Ex. Sec., Llewellyn M. Reed, 42 Florence Ave., Devon, Conn.
Nat. Dir., Henry Pfisterer, 111 Whitney Ave., New Haven, Conn.

Delaware

Pres., E. Powell Smith, 16 West 39th St., Wilmington, Del.
Sec., James H. Hallett, Jr., 1401 Lore Avenue, Gordon Heights, Wilmington, Del.
Nat. Dir., William A. McWilliams, 43 Division St., Dover, Del.

District of Columbia

Pres., C. Warren Bogan, 5147 Macomb St., N. W., Washington, D. C.
Sec., Michael Godfrey, P. O. Box 585, Benj. Franklin Sta., Washington 4, D. C.
Nat. Dir., Joseph H. Powers, 1750—16th St., N. W., Washington, D. C.

Florida

Pres., John E. Kiker, Jr., University of Florida, Gainesville, Fla.
Sec., Thomas L. Bransford, C. E. Dept., Univ. of Fla., Gainesville, Fla.
Nat. Dir., E. A. Anderson, 1301 Court House, Miami 32, Fla.

Georgia

Pres., A. O. White, Jr., 1417 Cit. & So. Bank Bldg., Atlanta, Ga.
Sec., George M. Normandy, P. O. Box 520, Atlanta 1, Ga.
Nat. Dirs., Roy J. Boston, 12 Capitol Square, SW. Atlanta 3, Ga.; Orbie Bostick, P. O. Box 4569, Atlanta 2, Ga.

Idaho

Pres., Jay E. Painter, 311—6th St., Idaho Falls, Idaho.
Sec., W. Purdy Eaton, 1704 Harrison Blvd., Boise, Idaho.
Nat. Dir., Leigh M. Huggins, 1621 Mountain View Drive, Boise, Idaho.

Illinois

Pres., Raymond G. Brichler, 7903 West A St., Belleville, Ill.
Exec. Sec., P. E. Roberts, 631 E. Green St., Champaign, Ill.
Sec. Treas., A. Douglas Spicer, 138 Payson St., Kewanee, Ill.
Nat. Dirs., Lee I. Osborn, Sherrard, Ill.; George DeMent, Rm. 1940, 20 N. Wacker Dr., Chicago 6, Ill.

Indiana

Pres., J. B. Wilson, 524 K. of P. Bldg., Indianapolis, Ind.
Sec., R. E. Long, 6220 Nimitz Dr., Indianapolis, Ind.
Exec. Sec., Thelma G. Patterson, 1131 Circle Tower Bldg., Indianapolis, Ind.
Nat. Dir., L. Eugene Easley, 6511 Evanston Ave., Indianapolis, Ind.

Kansas

Pres., Vernon W. Barlow, Monarch Cement Co., Humbolt, Kans.
Sec., Lester T. Hagadorn, c/o Wilson & Co. Engrs., P. O. Box 937, 223 N. Santa Fe, Salina, Kans.
Nat. Dir., Walter G. Johnson, 1831 Medford Ave., Topeka, Kans.

Maryland

Pres., Louis G. Smith, Gas & Elec. Co., Lexington Bldg., Baltimore, Md.
Sec. Treas., Wm. G. Robertson, Jr., 2315 St. Paul St., Baltimore, Md.
Nat. Dir., Owen W. Turpin, 1004 N. Charles St., Baltimore, Md.

Massachusetts

Pres., Clarence R. Westaway, 179 Marlborough St., Boston, Mass.
Sec., Fred A. Sawyer, Stone & Webster Engineering Corp., 49 Federal St., Boston 7, Mass.
Nat. Dirs., Edwin R. Gardner, 4 Walnut Rd., Swampscott, Mass.; Ernest L. Blair, Stone & Webster Engineering Corp., 49 Federal St., Boston 7, Mass.

Michigan

Pres., L. J. Richards, 1106 Sugnet Rd., Midland, Mich.
Sec., Robert L. Wells, 100 Farnsworth Ave., Detroit 2, Mich.
Nat. Dirs., A. F. Plant, 227 Curtis Bldg., Detroit, Mich.; Paul S. Calkins, 23230 Power Rd., Farmington, Mich.

Minnesota

Pres., W. L. Hinderman, 854 Builders Ex., Minneapolis, Minn.
Exec. Sec., Hal E. McWethy, 1000 Guardian Bldg., St. Paul, Minn.
Nat. Dirs., M. C. Peterson, 5524 Morgan Ave., S., Minneapolis, Minn.; H. H. Hill, 4512 Wooddale Ave., Minneapolis, Minn.

Missouri

Pres., Garvin H. Dyer, 123 W. Kansas St., Independence, Mo.
Exec. Sec., Clifford Wood, Box 365, Jefferson City, Mo.
Nat. Dirs., Prof. Joe Butler, Missouri School of Mines, Rolla, Mo.; Harold J. Bruegging, 719 Houchin St., Jefferson City, Mo.

Nebraska

Pres., S. A. Michael, 1504 Dodge St., Omaha, Nebr.
Sec., A. R. Homan, 5970 N. 33rd St., Omaha, Nebr.
Nat. Dir., B. H. Backlund, 5225 Kansas Ave., Omaha, Nebr.

Nevada

Pres., M. E. Lundberg, 542 Commercial St., Elko, Nev.
Sec., R. C. Barger, Box 338, Henderson, Nevada.
Nat. Dir., Robert Millard, 909 Canyon St., Ely, Nev.

New Mexico

Pres., Otto H. W. Blume, 3000 Gen. Chenault. N. E., Albuquerque, N. Mex.
Sec., T. T. Castonguay, Box 4053, Albuquerque, N. M.
Nat. Dir., Walter K. Wagner, 412 Lafayette Pl., Albuquerque, N. M.

New Jersey

Pres., William S. Dean, 38 Oakley Ave., Summit, N. J.
Sec. Treas., Eugene H. Koenig, 518 S. Forest Dr., Trenton, N. J.
Exec. Dir., Charles J. Dodge, 86 E. State St., Trenton, N. J.
Nat. Dirs., Edward R. Boate, 404 Everson Place, Westfield, N. J.; Louis F. Frazza, 225 Bamford Ave., Hawthorne, N. J.; Frank F. Hohnholt, 37 Oak St., Tenafly, N. J.; W. Earl Christian, Netherwood Ave., Box 215, Rt. 2, New Brunswick, N. J.

New York

Pres., Carl M. Gilt, 1008 E. 39th St., Brooklyn, N. Y.
Exec. Sec., Herald Beckjorden, 1941 Grand Central Terminal Bldg., New York, N. Y.
Nat. Dirs., C. Arnold Dutton, 75 W. Mohawk St., Buffalo 2, New York; Herbert F. Roemmele, Cooper Union, New York, N. Y.

North Carolina

Pres., George S. Rawlins, 119½ E. 5th St., Charlotte, N. C.
Sec., Robert B. Cochran, Jr., Box 5131, Raleigh, N. C.
Nat. Dir., M. F. Wooten, Jr., 215 Latta Arcade, Charlotte, N. C.

North Dakota

Pres., Edward J. Booth, 804 Tenth St., Bismarck, N. D.
Sec. Treas., Joseph Kirby, 827—13th St., Bismarck, N. D.
Nat. Dir., R. H. Myhra, Box 112, Minot, N. D.

Ohio

Pres., Charles P. Smith, 3789 Olentangy Blvd., Columbus, Ohio.
Exec. Sec., Lloyd A. Chacey, 5 E. Long St., Columbus, Ohio.
Nat. Dir., Robert E. Allen, 401 Leo St., Dayton, Ohio; Raymond A. Freese, 122 Romona, Cleveland 7, Ohio.

Oklahoma

Pres., W. H. Carson, 943 Chautauqua St., Norman, Okla.
Sec. Treas., Cecil Perkins, 1308 First Nat'l Bldg., Oklahoma City, Okla.
Exec. Sec., C. S. Worley, P. O. Box 987, Oklahoma City, Okla.
Nat. Dirs., Clark A. Dunn, A & M College, Stillwater, Okla.; G. W. McCullough, 1[illegible] Johnston Ave., Bartlesville, Okla.

Pennsylvania

Pres., Donald C. Peters, Mellon-Stuart Co., Pittsburgh, Pa.
Exec. Sec., John T. West, Jr., 228 N. Second St., Harrisburg, Pa.
Nat. Dirs., Ezra K. Nicholson, 1618 Lat[illegible] mer St., Philadelphia, Pa.; Donald C. Peters, Mellon-Stuart Co., Pittsburgh, Pa.; Robert A. Blackburn, 3110 Koppers Bldg., Pittsburgh, Pa.; Allan H. Kidder, 900 Sansom St., Philadelphia 5, Pa.

Puerto Rico

Pres., Alberto Hernandez, P. O. Box 12[illegible] San Juan, Puerto Rico.
Sec., Walter Torres Braschi, Box 12[illegible] Hato Rey, Puerto Rico.
Nat. Dir., Alberto Hernandez, Box 12[illegible] San Juan, Puerto Rico.

Rhode Island

Pres., Howard F. Carpenter, 37 Ernes[illegible] St., Providence, R. I.
Sec., Howard W. Holmes, 98 Burlington St., Providence 6, R. I.
Nat. Dir., Domenico A. Ionata, 1[illegible] Angell St., Providence, R. I.

South Carolina

Pres., Roy A. Stipp, 228 N. Main St., Box 1796, Greenville, S. C.
Sec. Treas., A. N. Stall, 56 Woodvale Ave., Greenville, S. C.
Nat. Dir., C. Langdon Cheves, 110 Tindal Ave., Greenville, S. C.

Tennessee

Pres., Albert Waters Stone, 4810 Midland Pike, Chattanooga, Tenn.
Sec., Charles L. Ridings, 300 Chamberlain Bldg., Chattanooga, Tenn.
Nat. Dir., Warner Howe, 76 Porter Bldg., Memphis, Tenn.

Texas

Pres., J. Nells Thompson, 2403 Tow[illegible] Dr., Austin, Tex.
Exec. Sec., Henry Harkleroad, 403 Nat[illegible] Bldg., Austin, Tex.
Nat. Dir., Noah E. Hull, P. O. Box 25[illegible] Houston, Tex.

Utah

Pres., J. Vernon Sharp, 2491 Olympus Dr., Salt Lake City, Utah.
Sec., John S. Duder, 1842 Michigan Ave., Salt Lake City, Utah.
Nat. Dir., Walter P. Henoch, 227 S. [illegible] East St., Salt Lake City, Utah.

Virginia

Pres., Dan H. Pletta, Box 366, Blacksburg, Va.
Sec., William T. St. Clair, 106 S. 3rd, Richmond 19, Va.
Nat. Dir., John B. McGaughy, 21st & Llewellyn Ave., Norfolk, Va.

Washington

Pres., Robert C. Detrich, 10557 Phinney, Seattle, Wash.
Exec. Sec., Ed Smith, Organization Service Bureau, American Building, Seattle 4, Wash.
Nat. Dir., Howard A. Stingle, E. 3[illegible] 30th, Spokane 6, Wash.

West Virginia

Pres., O. J. Swanson, Box 27, Gary, W. Va.
Exec. Sec., Ross B. Johnston, P. O. Box 249, Charleston, W. Va.
Nat. Dirs., Leslie C. Gates, P. O. Box 67[illegible] Beckley, W. Va.; Harry G. Kennedy, 13[illegible] Kanawha Valley Bldg., Charleston, W. Va.

Wisconsin

Pres., P. G. Ellis, 2318 Rowley Ave., Madison 5, Wisc.
Sec., Eldon C. Wagner, 2318 Rowley Ave., Madison, Wisc.
Nat. Dirs., A. J. Behling, 2326 S. 75th St., Milwaukee 14, Wisc.; Edwin J. Kallevang, Wisc. Power & Light Co., Madison, Wisc.

Strictly Business

Personalities . . . DR. JOHN P. HOWE has been appointed chief, Reactor Materials Section, Atomic Energy Research Department, NORTH AMERICAN AVIATION, INC., of Los Angeles; and DR. ROBERT L. LOFTNESS has been named group leader of chemical development under Dr. Howe. . . . GILBERT BUSKE is the new engine development engineer with REO MOTORS, INC., Lansing, Mich. . . . DAVID WALTERS has been appointed chief industrial engineer of BOHN ALUMINUM AND BRASS CORPORATION, Detroit, according to an announcement by S. D. DEN UYL, president. . . . HERBERT G. JOHNSON has been elected vice president in charge of sales of THE KULJIAN CORPORATION, Philadelphia, engineers and constructors. . . . The appointment of JOHN R. SNOWBALL of Columbus as consulting engineer to THE MARIETTA CONCRETE CORPORATION, Marietta, O., has been announced by FRANK L. CHRISTY, president . . . A. B. CAPRON has been named assistant works manager in charge of the tube mills and engineering, and NEWELL HAMILTON has been appointed manager of steel operations in the Tubular Products Division of THE BABCOCK & WILCOX COMPANY, Beaver Falls, Pa.

Mr. Walters

Mr. Reich

JOHN REICH has been advanced to the position of factory manager of the HYSTER COMPANY'S Danville, Ill., plant. . . . P. C. HALDEMAN has been promoted to works manager of the Foote Construction Equipment Division, BLAW-KNOX COMPANY, and H. C. STIRLING has been named to succeed him as general superintendent of the Rolls Division. The Foote Division is located in Nunda, N. Y., while the Rolls Division is in Pittsburgh, Pa. . . . ELECTRO RUST-PROOFING CORPORATION of Belleville, N. J., has recently announced the appointment of R. J. FITZGERALD as district manager of its Middle Atlantic States Division. . . . AUSTIN GOODYEAR, general manager of the rubber and conveyors divisions of HEWITT-ROBINS, INC., Stamford, Conn., has been elected a vice president of the company. . . . PAUL E. HUBBY has assumed the duties and title of chief engineer of IMPROVED RISK MUTUALS, White Plains, N. Y. . . . HARRY H. ARMSTRONG is now handling distributor sales for the Building Products Division of the AMERICAN WELDING AND MANUFACTURING COMPANY.

CHARLES C. REIFF is now chief engineer of the ROCKWELL MANUFACTURING COMPANY'S Delta Power Tool Division at Bellefontaine, O. . . . CALVIN W. TITTSLER of Leetonia, O., has been appointed Eastern and Southern regional sales manager for DELUXE SAW AND TOOL COMPANY, High Point, N. C., a subsidiary of ROCKWELL MANUFACTURING COMPANY. . . . N. RULISON KNOX has been appointed assistant to the chairman of POOR & COMPANY, Chicago railway supplies and road machinery manufacturers. . . . Three engineer-educators have temporarily joined E. I. DUPONT DE NEMOURS AND COMPANY'S Engineering Department under its "Year-In-Industry" program. They are WILLIAM T. ALEXANDER, Northeastern University; DR. ROBERT M. BOARTS, JR., University of Tennessee; and DR. ALBERT R. SPALDING, Purdue University. . . . ARTHUR M. ROTHMAN has been appointed district sales engineer, AMERICAN SILVER COMPANY, INC., Flushing, N. Y.

►

Reorganization and Changes . . . The NORDBERG MANUFACTURING COMPANY, Milwaukee, Wis., has announced the establishment of a new District Office in St. Louis, Mo., headed by HAROLD M. PROPP. . . . The Northeastern Region of the WESTINGHOUSE ELECTRIC CORPORATION has been reorganized to include five sales districts—Boston, Connecticut Valley, Newark, New York City, and New York State. . . . MONGERSON'S ELECTRICAL MACHINE WORKS, Bakersfield and Los Angeles, Cal., has now been incorporated, according to RAY H. MONGERSON, founder of the firm.

►

Industrial Exhibitions . . . Sponsored by the S & S MACHINERY COMPANY, the FIRST INTERNATIONAL MACHINE TOOL EXPOSITION is scheduled to open at 132-54th Street, Brooklyn, N. Y., on October 5. . . . More than 5,000 models and component parts of refrigeration and air conditioning equipment will be on display at the REFRIGERATION AND AIR CONDITIONING EXPOSITION in Cleveland, November 9-12, according to the REFRIGERATION EQUIPMENT MANUFACTURERS ASSOCIATION which sponsors the show. A total of 225 companies will be represented in the displays.

►

Operational Expansion . . . The CHAIN BELT COMPANY of Milwaukee has announced the acquisition of facilities in Canada for the manufacture of certain of its product lines. It has purchased the controlling interest in CROTHERS ENGINEERING, LTD., of Toronto, Ontario, which will now be operated as CANADIAN CHAIN BELT, LTD.

►

New Firms . . . The MISSION ENGINEERS, a firm offering complete professional engineering services to builders and developers, has been established in Santa Clara, Cal., by JOHN M. SARDIS, civil and structural engineer from San Francisco, JOHN L. WATERS, assistant city engineer of Santa Clara, and MILO LACY, civil engineer from Palo Alto.

Mr. Gage

U. S. FIRE PROTECTION ENGINEERING SERVICE, INC., has been established by a group of fire prevention and fire protection engineers under the presidency of FRANK H. GAGE. The firm is headquartered in Kansas City, Mo., and has facilities to handle work throughout the country.

HENRY J. KAISER has returned to the Canadian industrial scene with the establishment of a Canadian firm offering engineering, design, and construction services to industry and municipalities. The new firm, KAISER ENGINEERS DIVISION of HENRY J. KAISER CO., LTD., has its offices in Montreal, Quebec.

The MANNESMANN-MEER ENGINEERING & CONSTRUCTION CO. has been organized in Easton, Pa., by the MANNESMANN WORKS, Germany, in combination with MASCHINENFABRIK MEER A. G. The new U. S. company will offer a complete line of seamless tube mill machinery as well as hydraulic equipment and other special mill machinery, plus a complete engineering service for the planning, installation, and operation of the equipment.

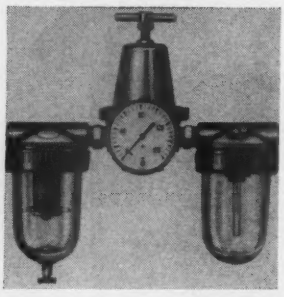
What's New

AMERICAN ENGINEER October, 1953
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 1 to:

Name .....
(Title)
Company .....
Street .....
City and Zone ..... State.....

NEW FILTER-REGULATOR-LUBRICATOR — Item 1



A new Filter-Regulator-Lubricator with numerous improvements is announced by Arrow Tools, Inc. Filter features porous bronze element which retains more sediment without serious loss of pressure. Lubricator delivers vaporized oil for more complete lubrication of precision working parts in air operated equipment. Regulator has positive action self-bleed feature, diaphragm of new type oil resistant nylon reinforced material, stainless steel bushings and center shaft.

AMERICAN ENGINEER October, 1953
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 2 to:

Name .....
(Title)
Company .....
Street .....
City and Zone ..... State.....

KNOCKED-DOWN STEEL DOOR FRAME — Item 2

A new knocked-down steel door frame designed to conserve valuable storage space and cut down on shipping costs is now being produced by the Steelcraft Manufacturing Co.

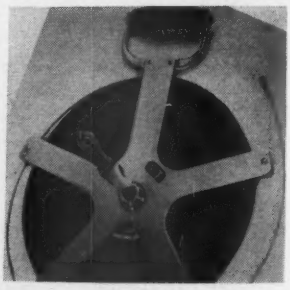
Shipped from factory in four pieces, two jambs, a head and a spreader bar. Easy to assemble using a simple tab connection and four sheet metal screws. Spreader bar keeps frame in alignment. Packaged for easy handling. "On site" storage requires little space. Manufactured in all standard sizes, bonderized and painted with a baked-on grey primer.

AMERICAN ENGINEER October, 1953
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 3 to:

Name .....
(Title)
Company .....
Street .....
City and Zone ..... State.....

5-ARM REEL FOR "LUCAS" TAPES — Item 3



Improved five-arm reel is designed specifically to accommodate new Lufkin "Lucas" long narrow tapes. Durable, made of heavy gauge nickel-plated steel. Five metal arms hold line in place without danger of overlapping or tangling. Tape roller in each arm smooths action. Reel is fitted with long winding handle for better leverage and easier winding, and a large drum for rapid reeling. Ample "D" type carrying handle.

AMERICAN ENGINEER October, 1953
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 4 to:

Name .....
(Title)
Company .....
Street .....
City and Zone ..... State.....

ADHESIVE ENGINEERING SYMBOLS — Item 4

Johnson Research Corp. announces improved Title Blocks, Bill of Materials, Change Blocks, Technical Symbols, etc. for use by engineers and draftsmen on drawings and tracings. Known as "TRANSEALS," a thin transparent printed plastic sheet with a pressure-sensitive adhesive coating protected by removable waxed paper, they eliminate rubber stamps and time-consuming hand lettering, symbol drawing and ruling usually required for engineering drawings. Furnished for application to either the reverse or face of drawings, TRANSEALS are easily applied by slight hand pressure without the use of heat.

AMERICAN ENGINEER October, 1953
1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 5 to:

Name .....
(Title)
Company .....
Street .....
City and Zone ..... State.....

6" CLAMP HAS 5½" THROAT DEPTH — Item 5

A new clamp which permits extreme throat depth without sacrificing strength is now available from Centinela Industrial Supply Co.

Straight line force at point of clamping eliminates stress and strain hazards. Torque converting, spring-bearing trunion eliminates distorting, twisting action; absorbs vibration, insuring a firm, steady grip throughout milling, routing, and shaping operations. Horizontal position of screw (at all openings) provides easy access to work area.